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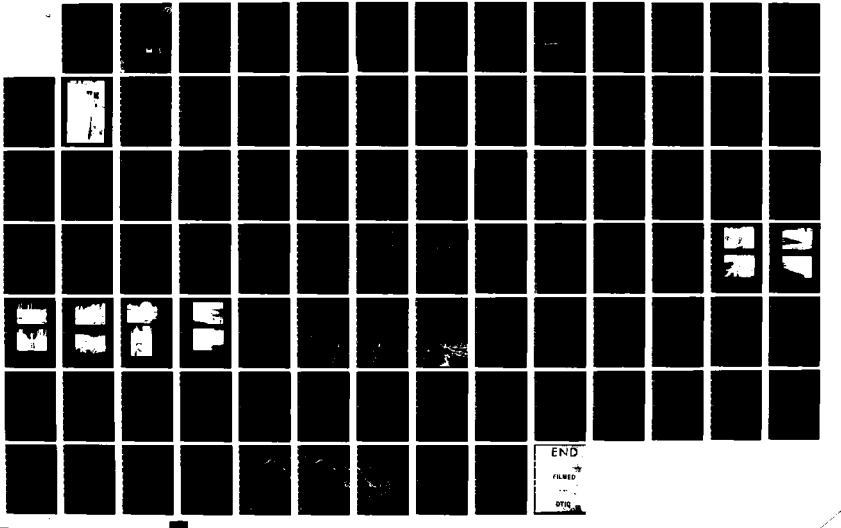

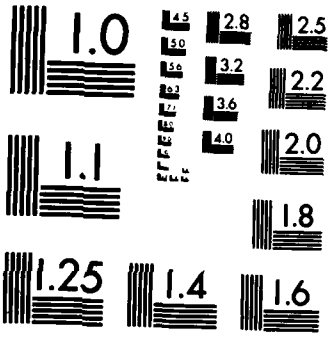

MICROCOPY RESOLUTION TEST CHART
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NAUGATUCK RIVER BASIN
WATERTOWN, CONNECTICUT

PIN SHOP POND DAM
CT 00127

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

JANUARY 1981

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Naugatuck River Basin
Watertown, Conn.
~~Pin Shop Pond Dam~~

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Pin Shop Pond Dam consists of an earth embankment with a 100 ft. long stone masonry overflow spillway located at the left end of the dam. The dam has a total length of 400 ft. and a maximum height of 23 ft. The dam is judged to be in poor condition. The dam is classified as small in size with a high hazard potential.A Test Flood equal to ½ the Probable Maximum Flood.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDED-E

MAR 18 1981

Honorable William A. O'Neill
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor O'Neill:

Inclosed is a copy of the Pin Shop Pond Dam (Ct-00127) Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. The report is based upon a visual inspection, a review of past performance, and a preliminary hydrological analysis. A brief assessment is included at the beginning of the report.

The preliminary hydrologic analysis has indicated that the spillway capacity for the Pin Shop Pond Dam would likely be exceeded by floods greater than 17 percent of the Probable Maximum Flood (PMF). Our screening criteria specifies that a dam of this class which does not have sufficient spillway capacity to discharge fifty percent of the PMF, should be adjudged as having a seriously inadequate spillway and the dam assessed as unsafe, non-emergency, until more detailed studies prove otherwise or corrective measures are completed.

The term "unsafe" applied to a dam because of an inadequate spillway does not indicate the same degree of emergency as that term would if applied because of structural deficiency. It does indicate, however, that a severe storm may cause overtopping and possible failure of the dam, with significant damage and potential loss of life downstream.

It is recommended that within twelve months from the date of this report the owner of the dam engage the services of a professional or consulting engineer to determine by more sophisticated methods and procedures the magnitude of the spillway deficiency. Based on this determination, appropriate remedial mitigating measures should be designed and completed within 24 months of this date of notification. In the interim a detailed emergency operation plan and warning system should be promptly developed. During periods of unusually heavy precipitation, round-the-clock surveillance should be provided.

MAR 18 1981

NEDED-E
Honorable William A. O'Neill

I have approved the report and support the findings and recommendations described in Section 7, with qualifications as noted above. I request that you keep me informed of the actions taken to implement these recommendations since this follow-up is an important part of the non-Federal Dam Inspection Program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. This report has also been furnished to the owner of the project, John Mancinone and Maurice Fabiani, Waterbury, CT.

Copies of this report will be made available to the public, upon request to this office, under the Freedom of Information Act, thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for the cooperation extended in carrying out this program.

Sincerely,

C.E. EDGAR, III
Colonel, Corps of Engineers
Division Engineer

PIN SHOP POND DAM
CT 00127

NAUGATUCK RIVER BASIN
WATERTOWN, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

IDENTIFICATION NO: CT 00127

NAME OF DAM: Pin Shop Pond Dam

TOWN: Watertown

COUNTY AND STATE: Litchfield County, Connecticut

STREAM: Steele Brook

DATE OF INSPECTION: December 15, 1980

BRIEF ASSESSMENT

The Pin Shop Pond Dam consists of an earth embankment with a 100 foot long stone masonry overflow spillway located at the left end of the dam. The dam has a total length of 400 feet and a maximum height of 23 feet. The outlet works located to the left of the spillway consist of an intake sluice gate which discharges into a stone masonry and concrete structure. A 16-inch gate valve drains the structure and discharges downstream of the spillway. A conduit to a downstream industrial complex is plugged with concrete.

The dam impounds Pin Shop Pond, which serves no formal purpose at the present time.

Based on the visual inspection, the dam is judged to be in poor condition. The future integrity of the dam can be affected by the lack of slope protection on the upstream slope, and continued erosion of the upstream and downstream slopes; trees on the embankment; continued undermining of the spillway apron; vegetation growing in open joints of the stone masonry training walls; the poor condition of the outlet works; and inadequate spillway capacity.

Based on the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the dam is classified as "Small" in size with a "High" hazard potential. A Test Flood equal to 1/2 the Probable Maximum Flood (1/2 PMF) was selected in accordance with the Corps of Engineers' Guidelines. Due to the small size of the impoundment, the Test Flood outflow was assumed to equal the Test Flood inflow of 9,500 cfs and would overtop the dam by 2.5 feet.

The spillway has a capacity of 3,200 cfs and is capable of discharging 34 percent of the Test Flood outflow.

It is recommended that the owner engage the services of a qualified, registered engineer experienced in the design of dams to design slope protection and repairs for the eroded areas of the embankment; to oversee tree removal; to investigate the condition of the spillway apron and training walls and the outlet works; and to perform a detailed hydraulic and hydrologic analysis.

In addition, the owner should clear brush from the embankment, institute a program of annual technical inspections by a qualified, registered engineer, prepare an operations and maintenance manual and put a formal warning system into effect.

The owner should implement the recommendations as described herein and in greater detail in Section 7 within one year after receipt of this Phase I Inspection Report.

Ronald G. Litke, P.E.
Project Engineer

Roald Haestad
President

This Phase I Inspection Report on Pin Shop Pond Dam (CT-00127) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

JOSEPH W. FINEGAN, JR., MEMBER
Water Control Branch
Engineering Division

ARAMAST MAHTESIAN, CHAIRMAN
Geotechnical Engineering Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the

condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possibl storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety of the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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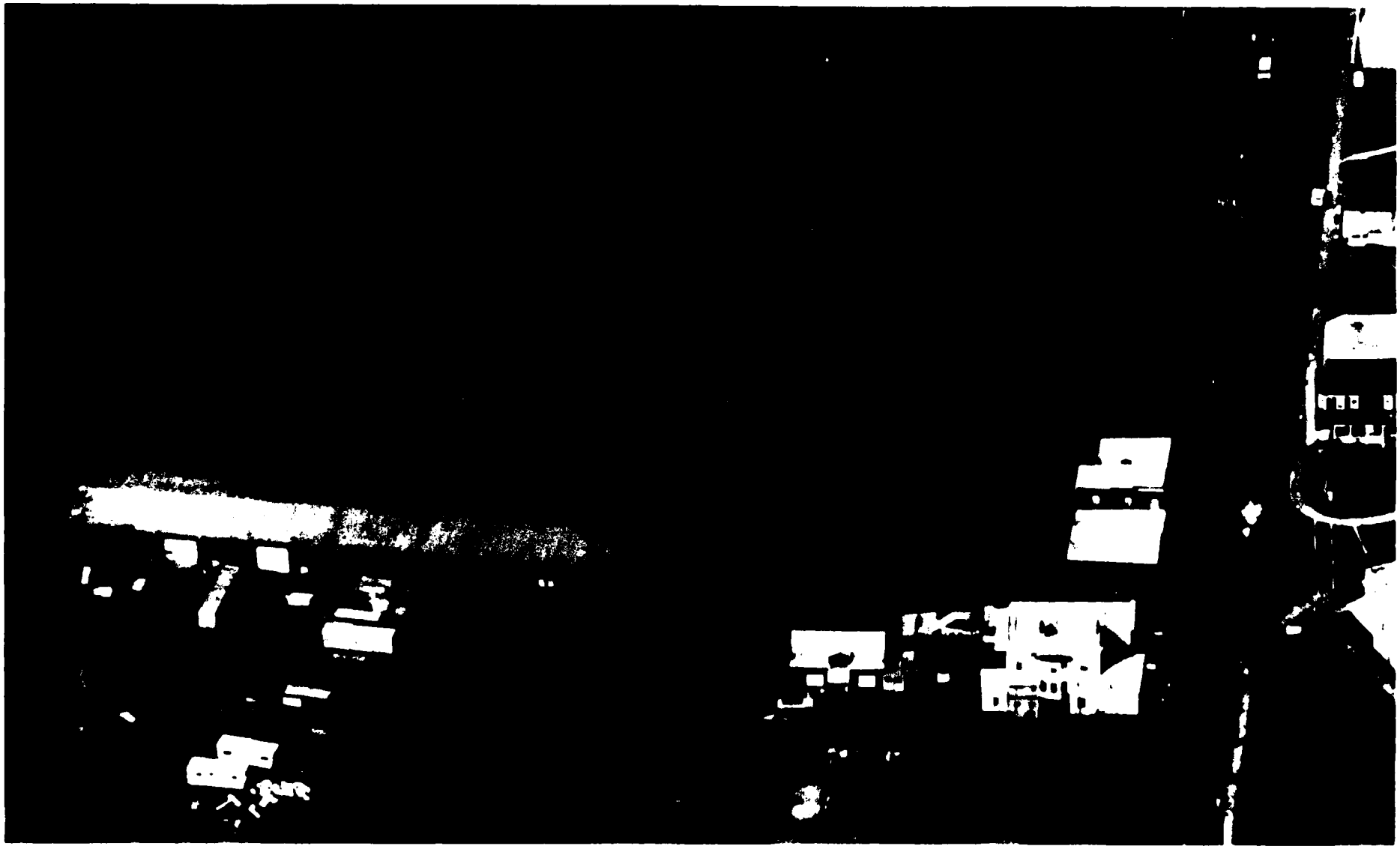


OVERVIEW PHOTO

U.S ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASSACHUSETTS

ROALD HAESTAD, INC.
CONSULTING ENGINEERS
WATERBURY, CONNECTICUT

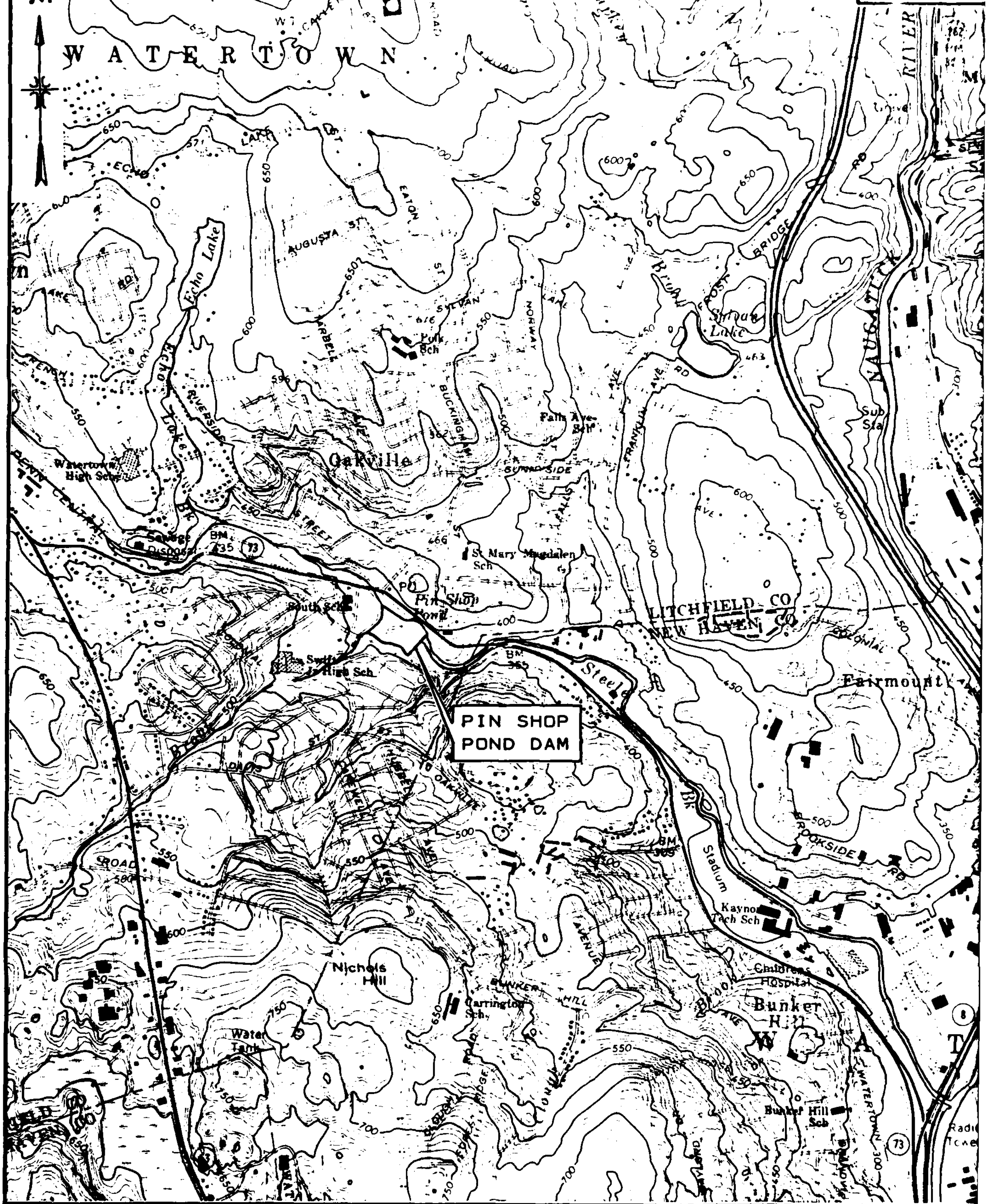
NATIONAL PROGRAM OF
INSPECTION OF
NON-FED. DAMS

PIN SHOP POND DAM - CT 00127

STEELE BROOK

WATERTOWN, CONNECTICUT 13 NOVEMBER 1980

FIGURE 1



LOCATION PLAN

PIN SHOP POND DAM
WATERTOWN, CONNECTICUT

SCALE 1" = 2000'

ROALD HAESTAD, INC.

WATERBURY QUADRANGLE 1

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

PIN SHOP POND DAM

PROJECT INFORMATION
SECTION 1

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Roald Haestad, Inc., has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Roald Haestad, Inc. under a letter of October 28, 1980, from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-81-C-0005 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection

The purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correctio in a timely manner by non-federal interest.
2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.
3. To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

The Pin Shop Pond Dam is located on Steele Brook, immediately south of Connecticut Route 73, approximately 6,000 feet east of the intersection of Connecticut Routes 63 and 73 in the Oakville section of Watertown, Connecticut. The dam is shown on the Waterbury Quadrangle map having coordinates of latitude N41° 35.2' and longitude W73° 05.1'.

b. Description of Dam and Appurtenances

The dam consists of an earth embankment with a stone masonry overflow spillway located at the left end of the dam and outlet works located to the left of the spillway. The total length of the dam, including the spillway and outlet works, is 400 feet and the maximum height is 23 feet.

The earth embankment section has a top width of 15 feet, an upstream slope of 2 horizontal to 1 vertical, and a downstream slope of 1.5 horizontal to 1 vertical. There is no formal slope protection present on the upstream or downstream slopes. Numerous trees are present on the slopes of the embankment. Near the center on the earth embankment at the top of the downstream slope there are two concrete pier which serve no apparent purpose at the present time.

The 100 foot long stone masonry overflow spillway has a maximum height of 18 feet, a top width of 4.5 feet and a vertical downstream face. A portion of the downstream spillway face approximately 40 feet wide by 8 feet high was repaired with concrete following the August 1955 Flood. Below the spillway there is a concrete apron which extends approximately 20 feet downstream. There are stone masonry training walls at the ends of the spillway. The outlet works are

located to the left of the spillway. The top of the embankment is 4.7 feet above spillway level. A 16 foot long stone masonry section between the left end of the spillway and the outlet works is 3.3 feet above spillway level and acts as an auxiliary spillway during heavy flows.

The outlet works consist of a stone masonry and concrete chamber. The chamber has an intake sluice gate of unknown size at the upstream end. A 16-inch gate valve drains the structure and discharges downstream of the spillway. A sluice gate also on the drain line appears to be inoperable. A conduit to a downstream industrial complex has been plugged with concrete. The structure and gates serve as the low level outlet for the dam.

c. Size Classification - "Small"

According to the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, a dam is classified as "Small" in size if the height is between 25 feet and 40 feet or the dam impounds between 50 Acre-Feet and 1,000 Acre-Feet. The dam has a maximum height of 23 feet and a maximum storage capacity of 82 Acre-Feet. Therefore the dam is classified as "Small" in size based upon the maximum storage capacity of 82 Acre-Feet.

d. Hazard Classification - "High"

Based upon the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the hazard classification for the dam is "High". A dam breach analysis indicates that a failure of Pin Shop Pond Dam would inundate the warehouse/office building immediately below the dam, flood the first floor of an industrial building further downstream, overtop Watertown Avenue (Connecticut Route 73) and Falls Avenue by 5 feet, and flood a multi-family dwelling to 3 feet above

sill level and 5 commercial buildings to depths of 4 feet. Prior to dam failure the maximum spillway discharge would overtop Watertown Avenue (Connecticut Route 73) by 2 feet and flood the 5 commercial buildings to a depth of 1 foot. The maximum spillway discharge would not affect the warehouse/office building immediately below the dam. A dam failure could result in the loss of more than a few lives and extensive property damage.

e. Ownership

Former Owner: Scovill, Incorporated

Present Owner: John Mancinone and Maurice Fabiani
203 Robinwood Road
Waterbury, Connecticut 06708
(203) 574-1885

f. Operator

John Mancinone and Maurice Fabiani
203 Robinwood Road
Waterbury, Connecticut 06708
(203) 574-1885

g. Purpose of Dam

The dam currently serves no formal purpose. In the past water has been drawn from the impoundment for industrial use.

h. Design and Construction History

There is no design or construction history available for the dam. It was reported that the area at the base of the spillway was eroded and a portion of the downstream face of the spillway was damaged during the August 1955 Flood. A concrete apron was installed at the base of the spillway and the stone masonry wall repaired with concrete masonry in the summer of 1956.

i. Normal Operational Procedures

There are no operational procedures in effect for the dam.

1.3 Pertinent Data

a. Drainage Area

The drainage area consists of 11.9 square miles of "rolling" terrain including densely developed sections of Watertown and Oakville. There are several impoundments within the watershed.

b. Discharge at Damsite

Discharge at the damsite is over a 100 foot long stone masonry spillway. Water may also flow through the outlet works at the left end of the dam to the stream channel below the spillway.

1.	Outlet Works (conduits) Size:	16-inch
	Invert Elevation at Outlet:	377.3
	Discharge Capacity:	30 cfs @ pool elevation 391.5
2.	Maximum Known Flood at Damsite:	3,000 cfs^{+} - August 1955
3.	Ungated Spillway Capacity at Top of Dam:	3,160 cfs
	Elevation:	391.5
4.	Ungated Spillway Capacity at Test Flood Elevation:	5,875 cfs
	Elevation:	393.9
5.	Gated Spillway Capacity at Normal Pool Elevation:	N/A
	Elevation:	
6.	Gated Spillway Capacity at Test Flood Elevation:	N/A
	Elevation:	
7.	Total Spillway Capacity at Test Flood Elevation:	5,875 cfs
	Elevation:	393.9
8.	Total Project Discharge at Top of Dam:	3,200 cfs*
	Elevation:	391.5
9.	Total Project Discharge at Test Flood Elevation:	9,500 cfs*
	Elevation:	393.9

*Includes discharge over area of outlet works.

c. Elevation - Feet Above Mean Sea Level (NGVD)

1. Streambed at Toe of Dam:	368.8
2. Bottom of Cutoff:	Unknown
3. Maximum Tailwater:	N/A
4. Normal Pool:	386.8
5. Full Flood Control Pool:	N/A
6. Spillway Crest:	386.8
7. Design Surcharge - Original Design:	Unknown
8. Top of Dam:	391.5
9. Test Flood Surcharge:	393.9

d. Reservoir - Length in Feet

1. Normal Pool:	800
2. Flood Control Pool:	N/A
3. Spillway Crest Pool:	800
4. Top of Dam:	1,600
5. Test Flood Pool:	1,800

e. Storage - Acre-feet

1. Normal Pool:	32 Acre-Feet
2. Flood Control Pool:	N/A
3. Spillway Crest Pool:	32 Acre-Feet
4. Top of Dam:	82 Acre-Feet
5. Test Flood Pool:	91 Acre-Feet

f. Reservoir Surface - Acres

1. Normal Pool:	6.4 Acres
2. Flood-Control Pool:	N/A
3. Spillway Crest:	6.4 Acres
4. Test Flood Pool:	19.1 Acres
5. Top of Dam:	14.7 Acres

g. Dam

1. Type: Earth Embankment

2. Length: 400 Feet including 265 foot long earth embankment, 100 foot long stone masonry spillway and outlet wor

3. Height: Maximum height of Earth Embankment - 15 feet
Maximum height of Dam - 23 feet

4. Top Width: 15 feet

5. Side Slopes: Upstream - 2 horizontal to 1 vertical
Downstream - 1.5 horizontal to 1 vertical

6. Zoning: Unknown

7. Impervious Core: Unknown

8. Cutoff: Unknown

9. Grout Curtain: N/A

10. Other:

h. Diversion and Regulating Tunnel - N/A

i. Spillway

1. Type:	Stone masonry overflow section with upstream earth embankment
2. Length of Weir:	100 feet
3. Crest Elevation with Flash Boards: without Flash Boards:	 N/A 386.8
4. Gates:	N/A
5. Upstream Channel:	N/A
6. Downstream Channel:	Natural Channel of Steele Brook
7. General:	A 16 foot long stone masonry section to the left of the spillway has an elevatio of 390.1 and acts as an auxiliary spillw during heavy flows.

j. Regulating Outlets

1. Invert:	377.3 at outlet of 16-inch drain gate val
2. Size:	16-inch
3. Description:	Intake sluice gate of unknown size discharges to stone masonry and concrete structure, 16-inch gate valve drains structure.
4. Control Mechanism:	Manually operated
5. Other:	Conduit to downstream location plugged with concrete.

ENGINEERING DATA
SECTION 2

2.1 Design Data

There was no design data available for review on either the dam or the spillway.

2.2 Construction Data

There was no construction data available for review on either the dam or the spillway. It was reported that the area at the base of the spillway was eroded and a portion of the downstream face of the spillway was damaged during the August 1955 Flood. Repairs were made in the summer of 1956.

2.3 Operational Data

There was no operational data available for review.

2.4 Evaluation of Data

a. Availability

Design or construction data was not available from either the State of Connecticut Department of Environmental Protection, the present owner of the dam, or the former owner of the dam.

b. Adequacy

As no design or construction information was available, the assessment of the condition of the dam was based on the visual inspection, past performance history, and hydrologic and hydraulic calculations performed for this Report.

VISUAL INSPECTION

SECTION 3

3.1 Findings

a. General

The visual inspection of the dam was conducted on December 15, 1980. At the time of inspection approximately 0.1 feet of water was flowing over the spillway.

The dam consists of an earth embankment with a stone masonry overflow spillway located at the left end of the dam, and outlet works located to the left of the spillway, Photos 1 and 2.

b. Dam

The upstream slope of the dam is overgrown with numerous trees up to 8-inches in diameter, Photo 3. There is no riprap slope protection present, and considerable erosion has taken place at and above the normal water line, Photo 4. The crest is fairly level and is covered with grass, brush and small trees, Photo 1. An erosion path is worn at about the centerline of the crest. The downstream slope is covered with numerous trees up to 12-inches in diameter, Photo 5. The slope is relatively steep in some areas and has an average slope of about 1.5 horizontal to 1 vertical. Several erosion paths are present on the downstream slope, including one at the left end of the earth embankment which cuts back into the crest and measures approximately 5 feet wide and 5 feet deep, Photo 6. Near the center of the earth embankment at the top of the downstream slope there are two small concrete piers which serve no apparent purpose at the present time. There was no seepage observed on either the downstream slope or in the area immediately downstream of the dam.

c. Appurtenant Structures

The appurtenant structures consist of the overflow spillway and the outlet works.

Spillway

The overflow spillway consists of a stone masonry structure with an upstream earth embankment and a downstream concrete apron. On the right half of the spillway a portion of the stone masonry on the downstream face, approximately 40 feet long by 8 feet high, has been replaced by concrete, Photo 7. A section of the crest at the center of the spillway is slightly higher in elevation, possibly indicating uplift of one of the cap stones near the center of the spillway, Photo 7. Also near the center of the spillway at the base of the wall there is a 2 foot wide by 1.5 foot high opening in the stone masonry. An orange stain on the downstream apron in the vicinity of the opening may indicate seepage through the opening, Photo 7. The downstream edge of the concrete apron has been undermined, Photos 7 and 8; however, no cracks or structural deficiencies were noted in the apron.

The spillway training walls are constructed of stone masonry. There are trees growing immediately behind the right training wall, Photo 9. There is vegetation growing in open joints of the stone masonry of both the right and left training walls, Photos 9 and 10.

Outlet Works

The outlet works located at the left end of the dam consist of an upstream intake sluice gate, Photo 11, which discharges into a stone masonry and concrete structure. A sluice gate of unknown size on the inside wall of the structure and a 16-inch gate valve on the outside wall, drain the structure and discharge into the stream channe

below the spillway, Photo 2. The gate valve was opened approximately three quarters of the way and water was flowing from the gate valve at the time of inspection. It is not known whether the flow was from seepage through the chamber walls, or from leakage or partial opening of the intake gate. A conduit discharging to a downstream industrial complex is plugged with concrete. The structure is partially filled with debris and it is not known whether the gates are operable. The structure and gates serve as the low level outlet for the dam.

d. Reservoir Area

There are no indications of instability along the edges of the reservoir in the vicinity of the dam.

e. Downstream Channel

The downstream channel is the natural channel of the Steele Brook. There is a foot bridge across the channel, approximately 75 feet downstream of the dam. The center pier of the foot bridge has settled considerably, Photo 12. The stream channel would be obstructed in the event of a failure of the bridge. Approximately 275 feet farther downstream there is a pipe bridge across the channel.

3.2 Evaluation

On the basis of the visual inspection, the dam is considered to be in poor condition. Features that could affect the future integrity of the dam are the following:

1. The lack of slope protection on the upstream slope of the dam and continued erosion of the upstream and downstream slope, particularly in the area to the right of the spillway, could lead to a breach of the dam.

2. Trees on the embankment and in the immediate downstream area

of the dam could be overturned during a storm, damaging the embankment. Root systems could provide seepage paths leading to internal erosion and piping failure of the embankment.

3. Continued undermining of the spillway apron could lead to failure of the apron and subsequent damage to the spillway weir.

4. Trees growing behind the right training wall and vegetation growing in open joints of both walls could lead to failure of the walls.

5. The poor condition of the outlet works makes their ability to function questionable.

OPERATIONAL AND MAINTENANCE PROCEDURES

SECTION 4

4.1 Operational Procedures

a. General

The dam presently serves no formal purpose, therefore there are no operational procedures for the dam.

b. Description of Any Warning System in Effect

There is no downstream warning system in effect for the dam.

4.2 Maintenance Procedures

a. General

There are no maintenance procedures for the dam.

b. Operating Facilities

There are no maintenance procedures for the operating facilities.

4.3 Evaluation

It was reported that no operational and maintenance procedures are in effect for the dam, which is evidenced by the general condition of the embankment, spillway apron and outlet works.

An Operations and Maintenance Manual should be prepared for the dam and operating facilities, and a formal warning system should be put into effect. In addition, the dam should be inspected annually by a qualified, registered engineer.

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

SECTION 5

5.1 General

The spillway for the Pin Shop Pond Dam consists of a 100 foot long stone masonry overflow section with an upstream earth embankment located at the left end of the dam. The spillway crest is 4.7 feet below the top of the dam. A 16-foot long stone masonry section at the left abutment is 1.4 feet below the top of the dam and would act as an auxiliary spillway.

The outlet works is located at the left abutment and consists of a stone masonry and concrete chamber. The roof of the structure has collapsed and the chamber is partially full of debris including the remains of a wooden trash rack. The chamber has an intake sluice gate of unknown size at the upstream end and a sluice gate and 16-inch gate valve on the blow-off. The blow-off has a capacity of about 30 cfs and discharges downstream of the spillway apron. The gate valve was opened about three-quarters of the way, the sluice gates did not appear to be operable.

The watershed area is 11.9 square miles of "rolling" terrain including densely developed sections of Oakville and Watertown. There are several impoundments within the watershed mostly in the upper reaches, only two or three are of significant size. Watershed elevations range from 950 feet in the north to 387 at the dam.

5.2 Design Data

No design data was available for the dam or the spillway.

5.3 Experience Data

The August 1955 Flood was reported to have come close to overtopping the embankment although no overtopping occurred. The downstream stone masonry face of the spillway was damaged during the flood.

5.4 Test Flood Analysis

The dam is classified as "Small" in size, with a "High" hazard potential. According to the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the Test Flood for a "Small", "High" hazard dam is in the range of the Probable Maximum Flood (PMF) to 1/2 the Probable Maximum Flood (1/2 PMF), depending on the involved risk.

A Test Flood equal to the 1/2 PMF was selected because of the low height of the dam and the small storage capacity of the impoundment.

An inflow flood peak was calculated for the 11.9 square mile watershed using a peak inflow of 1,600 cubic feet per second per square mile (csm) for the PMF from the guide curve for "rolling" terrain supplied by the Corps of Engineers. The 1/2 PMF inflow was calculated to be about 9,500 cfs. The outflow is equal to the inflow because of the minimum surcharge storage in comparison to the volume of runoff.

The spillway has a capacity of 3,200 cfs equal to 34 percent of the Test Flood. The Test Flood would overtop the embankment by about 2-1/2 feet.

The spillway capacity is judged to be inadequate requiring further evaluation and remedial action.

5.5 Dam Failure Analysis

A dam failure analysis was made using the Corps of Engineers' "Rule of Thumb" guidance. Failure was assumed when the water level reached the top of the dam, producing a maximum head of 23 feet.

The spillway discharge prior to dam breach was significant when compared to the dam breach flows, and was taken into consideration in the flood routings. The spillway discharge was first routed through each reach, assuming steady state conditions, and the storage volume thus obtained subtracted from the storage required for the dam breach flood in order to derive the usable storage within the reach.

The calculated dam breach, 23 feet high by 156 feet long, would release up to 29,000 cfs into Steele Brook below the dam. The dam breach was assumed to include the spillway, and therefore the spillway discharge was not added to the dam breach flow. The flood wave would inundate the warehouse/office building below the dam and cause flooding of the first floor of an industrial building farther downstream before overtopping Watertown Avenue (Connecticut Route 73) by 5 feet. The flood waters would continue downstream, flooding Falls Avenue by 5 feet and inundating a multi-family dwelling to a depth of 3 feet above sill level. Downstream of Falls Avenue 5 commercial buildings would be inundated to a depth of 4 feet. For the next 4,000 feet downstream the flood waters would be contained within the stream channel and its overbank areas without causing damage. Downstream of the Huntingdon Avenue Bridge the capacity of the channel varies. The dam breach flood waters would overtop the low points on the channel banks and cause minor flooding.

The maximum spillway discharge of 3,200 cfs prior to dam failure

would overtop Watertown Avenue (Connecticut Route 73) by 2 feet and inundate the commercial buildings downstream of Falls Avenue to a depth of 1 foot. The channel and bridges downstream of the commercia buildings can discharge the spillway flow. The warehouse/office buil ing immediately downstream of the dam would not be affected by the maximum spillway discharge.

The dam was classified as "High" potential hazard because of the possible loss of more than a few lives and extensive downstream property damage should the dam fail.

6.1 Visual Observations

The visual observations did not disclose any evidence of present structural instability. The future stability of the dam could be affected by:

1. Continued erosion of the embankment.
2. Continued undermining of the spillway apron.
3. Trees growing on the embankment and vegetation growing in the open joints of the stone masonry training walls.

6.2 Design and Construction Data

There was no information available on the design or construction of the dam.

6.3 Post-Construction Changes

The August 1955 Flood eroded the area at the base of the spillway and damaged a portion of the downstream face of the stone masonry spillway. In the summer of 1956 the area at the base of the spillway was repaired by installing a concrete apron and the downstream face of the stone masonry spillway was repaired with concrete masonry.

6.4 Seismic Stability

The dam is located in Seismic Zone 1 and in accordance to the recommended Phase I Guidelines does not warrant seismic stability analysis.

7.1 Dam Assessment

a. Condition

On the basis of the visual inspection, Pin Shop Pond Dam is judged to be in poor condition. The future integrity of the dam could be affected by the following conditions:

1. The lack of slope protection on the upstream slope and continued erosion of the embankment.
2. Trespass erosion of the downstream slope.
3. Trees on the embankment and in the immediate downstream area of the dam.
4. Continued undermining of the spillway apron.
5. Vegetation growing in open joints of the stone masonry training walls.
6. The poor condition of the outlet works.

An evaluation of the hydrologic and hydraulic features of the dam determined that the spillway is capable of passing 34 percent of the Test Flood outflow (1/2 PMF).

b. Adequacy of Information

As no information was available on the dam, the assessment of the condition of the dam is based on the visual inspection, past performance history, and hydraulic and hydrologic calculations made for this Report.

c. Urgency

The recommendations presented in Sections 7.2 and 7.3 should be carried out within one year of receipt of this Report.

7.2 Recommendations

The following recommendations should be carried out under the direction of a qualified, registered engineer:

1. Design repairs for the eroded areas of the upstream and downstream slopes of the embankment.

2. Design slope protection for the upstream and downstream slope of the dam.

3. Remove trees, stumps and root systems from the slopes and crest of the dam and in the area within 20 feet of the downstream toe, and backfill with proper material.

4. Investigate the undermining of the spillway apron and recommend remedial measures.

5. Investigate the condition of the spillway training walls and oversee removal of vegetation from open joints in the masonry, and repair of the joints.

6. Investigate the condition and capacity of the outlet works and recommend remedial measures to make the outlet works operable.

7. Perform a detailed hydrologic and hydraulic analysis in order to determine the need for and means to provide additional project discharge capacity.

The owner should implement all recommendations of the engineer based upon the findings of the above.

7.3 Remedial Measures

a. Operation and Maintenance Procedures

1. A program of annual technical inspections by qualified, registered engineers should be instituted.

2. Brush should be cleared from the crest and slopes of the dam. The embankment should be maintained free of brush.

3. An operations and maintenance manual should be prepared for the dam and the operating facilities.

4. Develop a downstream warning system in case of an emergency at the dam.

7.4 Alternatives

As the dam no longer serves any formal purpose, one alternative to the above recommendations would be to remove the dam.

APPENDIX A

VISUAL CHECK LIST WITH COMMENTS

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT: Pin Shop Pond Dam

DATE: 12/15/80 TIME: 3:00 p.m. WEATHER: Cloudy 25°

W.S. ELEVATION: 386.85 U.S. N/A DN.S
0.05' above spillway

	PARTY	DISCIPLINE
1.	Roald Haestad, P.E. Roald Haestad, Inc.	Civil/Geotechnical
2.	Donal L. Smith, P.E. Roald Haestad, Inc.	Civil/Hydrologic
3.	Ronald G. Litke, P.E. Roald Haestad, Inc.	Civil/ Structural
4.		
5.		
6.		

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Dam Embankment	RH, DLS, RGL	Erosion on U.S.&D.S. slopes; overgrown with trees
2.	Outlet Works - Intake Channel & Intake Structure	RH, DLS, RGL	No intake channel, structure is stone masonry
3.	Outlet Works - Control Tower	RH, DLS, RGL	Structure filled with debris, condition of gates unknown
4.	Outlet Works - Outlet Structure & Channel	RH, DLS, RGL	16-inch gate valve on D.S. wall o control tower disch. below spillw
5.	Outlet Works - Spillway Weir, Appr.&Disch. Channel	RH, DLS, RGL	Spillway apron undermined at downstream edge
6.			
7.			
8.			
9.			
10.			
11.			
12.			

PERIODIC INSPECTION CHECK LIST

PROJECT: Pin Shop Pond Dam DATE: 12/15/80

PROJECT FEATURE: Dam Embankment NAME: RH

DISCIPLINE: Civil/Geotechnical Engineers NAME: RGL,DLS

AREA ELEVATION	CONDITIONS
DAM EMBANKMENT	
CREST ELEVATION	391.5
CURRENT POOL ELEVATION	386.85 (.05 above spillway)
MAXIMUM IMPOUNDMENT TO DATE	391.5± August 1955
SURFACE CRACKS	None observed
PAVEMENT CONDITION	Not paved - path worn at centerline
MOVEMENT OR SETTLEMENT OF CREST	Crest surface somewhat irregular, probably due to erosion not settlement
LATERAL MOVEMENT	None observed
VERTICAL ALIGNMENT	Area at training wall lower due to erosion
HORIZONTAL ALIGNMENT	Good
CONDITION AT ABUTMENT AND AT CONCRETE STRUCTURES	Erosion behind right training wall
INDICATIONS OF MOVEMENT OF STRUCTURAL ITEMS ON SLOPES	None observed
TRESPASSING ON SLOPES	Several paths on slopes, most severe at left end of dam 5' wide by 5' deep
VEGETATION ON SLOPES	Numerous trees up to 12 inches in diameter
SLOUGHING OR EROSION OF SLOPES OR ABUTMENTS	Erosion at and above waterline upstream, several paths downstream
ROCK SLOPE PROTECTION - RIPRAP FAILURES	No riprap on upstream slope
UNUSUAL MOVEMENT OR CRACKING AT OR NEAR TOES	None observed
UNUSUAL EMBANKMENT OR DOWNSTREAM SEEPAGE	None observed
PIPING OR BOILS	None observed
FOUNDATION DRAINAGE FEATURES	None observed
TOE DRAINS	None observed
INSTRUMENTATION SYSTEM	None observed

PERIODIC INSPECTION CHECK LIST

PROJECT: Pin Shop Pond Dam DATE: 12/15/80

PROJECT FEATURE: Outlet Works - Intake Channel and Intake Structure NAME: RH

DISCIPLINE: Civil/Geotechnical Engineers NAME: DLS, RGL

AREA EVALUATED	CONDITIONS
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	No intake channel
A. APPROACH CHANNEL:	
SLOPE CONDITIONS	
BOTTOM CONDITIONS	
ROCK SLIDES OR FALLS	
LOG BOOM	
DEBRIS	
CONDITION OF CONCRETE LINING	
DRAINS OR WEEP HOLES	
B. INTAKE STRUCTURE:	
CONDITION OF CONCRETE	Stone masonry with some open joints
STOP LOGS AND SLOTS	N/A

PERIODIC INSPECTION CHECK LIST

PROJECT: Pin Shop Pond Dam DATE: 12/15/80

PROJECT FEATURE: Outlet Works - Control Tower NAME: RH

DISCIPLINE: Civil Engineers NAME: RGL, DLS

AREA EVALUATED	CONDITIONS
OUTLET WORKS - CONTROL TOWER	
A. CONCRETE AND STRUCTURAL:	Stone masonry structure appears to have been encased with concrete
GENERAL CONDITION	Concrete and stone masonry in fair condition, structure filled with debris
CONDITION OF JOINTS	Some spalling at construction joints
SPALLING	Some spalling at construction joints
VISIBLE REINFORCING	N/A
RUSTING OR STAINING OF CONCRETE	None observed
ANY SEEPAGE OR EFFLORESCENCE	Some efflorescence at construction joint
JOINT ALIGNMENT	N/A
UNUSUAL SEEPAGE OR LEAKS IN GATE CHAMBER	Water flowing from chamber, possibly fro leakage at intake gate
CRACKS	None observed
RUSTING OR CORROSION OF STEEL	N/A
B. MECHANICAL AND ELECTRICAL:	
AIR VENTS	N/A
FLOAT WELLS	N/A
CRANE HOIST	N/A
ELEVATOR	N/A
HYDRAULIC SYSTEM	N/A
SERVICE GATES	Condition unknown. 16" drain gate valve open 3/4 of way
EMERGENCY GATES	N/A
LIGHTNING PROTECTION SYSTEM	N/A
EMERGENCY POWER SYSTEM	N/A
WIRING AND LIGHTING SYSTEM IN GATE CHAMBER	N/A

PERIODIC INSPECTION CHECK LIST

PROJECT: Pin Shop Pond Dam DATE: 12/15/80

PROJECT FEATURE: Outlet Works - Outlet Structure and Outlet Channel NAME: RH

DISCIPLINE: Civil Engineers NAME: DLS, RGL

AREA EVALUATED	CONDITIONS
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	Outlet structure consists of 16-inch gate valve on downstream wall of control tower
GENERAL CONDITION OF CONCRETE	
RUST OR STAINING	None observed
SPALLING	Some spalling at construction joints
EROSION OR CAVITATION	None observed
VISIBLE REINFORCING	None observed
ANY SEEPAGE OR EFFLORESCENCE	Some efflorescence at construction joints
CONDITION AT JOINTS	Some spalling and efflorescence at joints
DRAIN HOLES	N/A
CHANNEL	Drain gate discharges to stream channel below spillway
LOOSE ROCK OR TREES OVERHANGING CHANNEL	None of significance
CONDITION OF DISCHARGE CHANNEL	Natural stream channel

PERIODIC INSPECTION CHECK LIST

PROJECT: Pin Shop Pond Dam DATE: 12/15/80

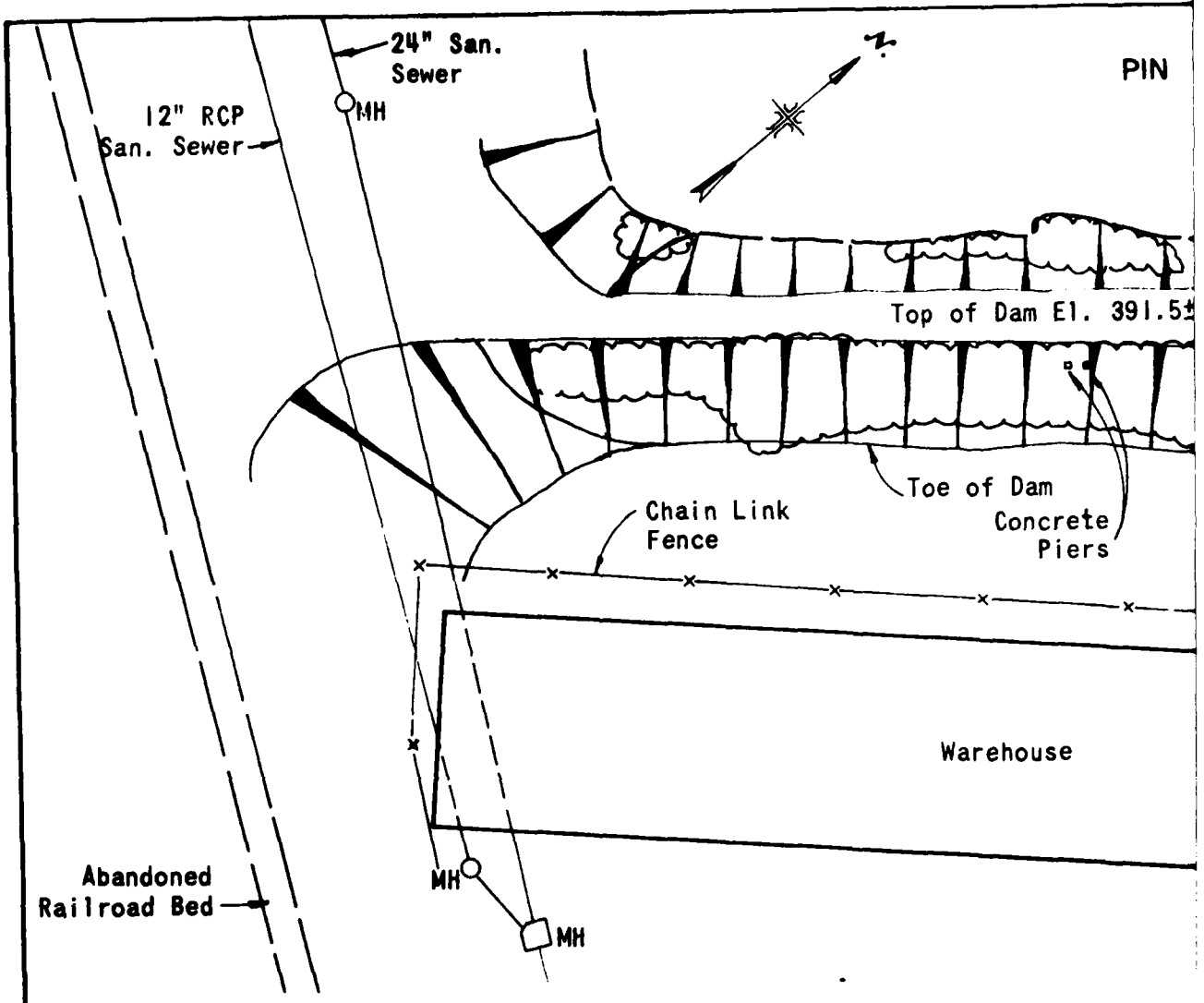
PROJECT FEATURE: Outlet Works - Spillway Weir, Approach and Discharge Channel NAME: RH

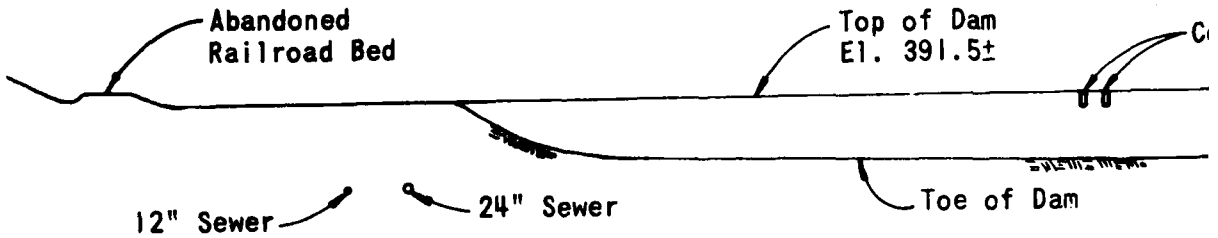
DISCIPLINE: Civil/Geotechnical Engineers NAME: DLS, RGL

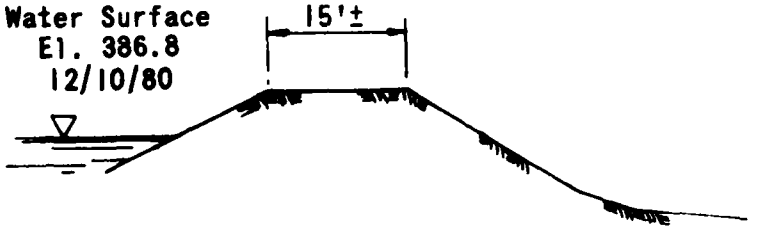
AREA EVALUATED	CONDITIONS
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
A. APPROACH CHANNEL:	No approach channel
GENERAL CONDITION	
LOOSE ROCK OVERHANGING CHANNEL	
TREES OVERHANGING CHANNEL	
FLOOR OF APPROACH CHANNEL	
B. WEIR AND TRAINING WALLS:	
GENERAL CONDITION OF CONCRETE	Stone masonry weir and training walls, portion of D.S. face of weir is concrete
RUST OR STAINING	Orange stain on apron at 2'xl.5' opening at base of spillway
SPALLING	None observed. Some open joints in stone masonry training walls
ANY VISIBLE REINFORCING	None observed
ANY SEEPAGE OR EFFLORESCENCE	None observed
DRAIN HOLES	None observed
C. DISCHARGE CHANNEL:	
GENERAL CONDITION	Concrete spillway apron undermined at D.S. edge. Discharge channel natural streambed of Steele Brook.
LOOSE ROCK OVERHANGING CHANNEL	None observed
TREES OVERHANGING CHANNEL	None of any significance
FLOOR OF CHANNEL	Loose rock
OTHER OBSTRUCTIONS	Foot bridge D.S. center pier has settled, would obstruct flow if bridge failed.

APPENDIX B

ENGINEERING DATA







SECTION A-A

Scale: 1" = 20' Horiz. & Vert.

4.

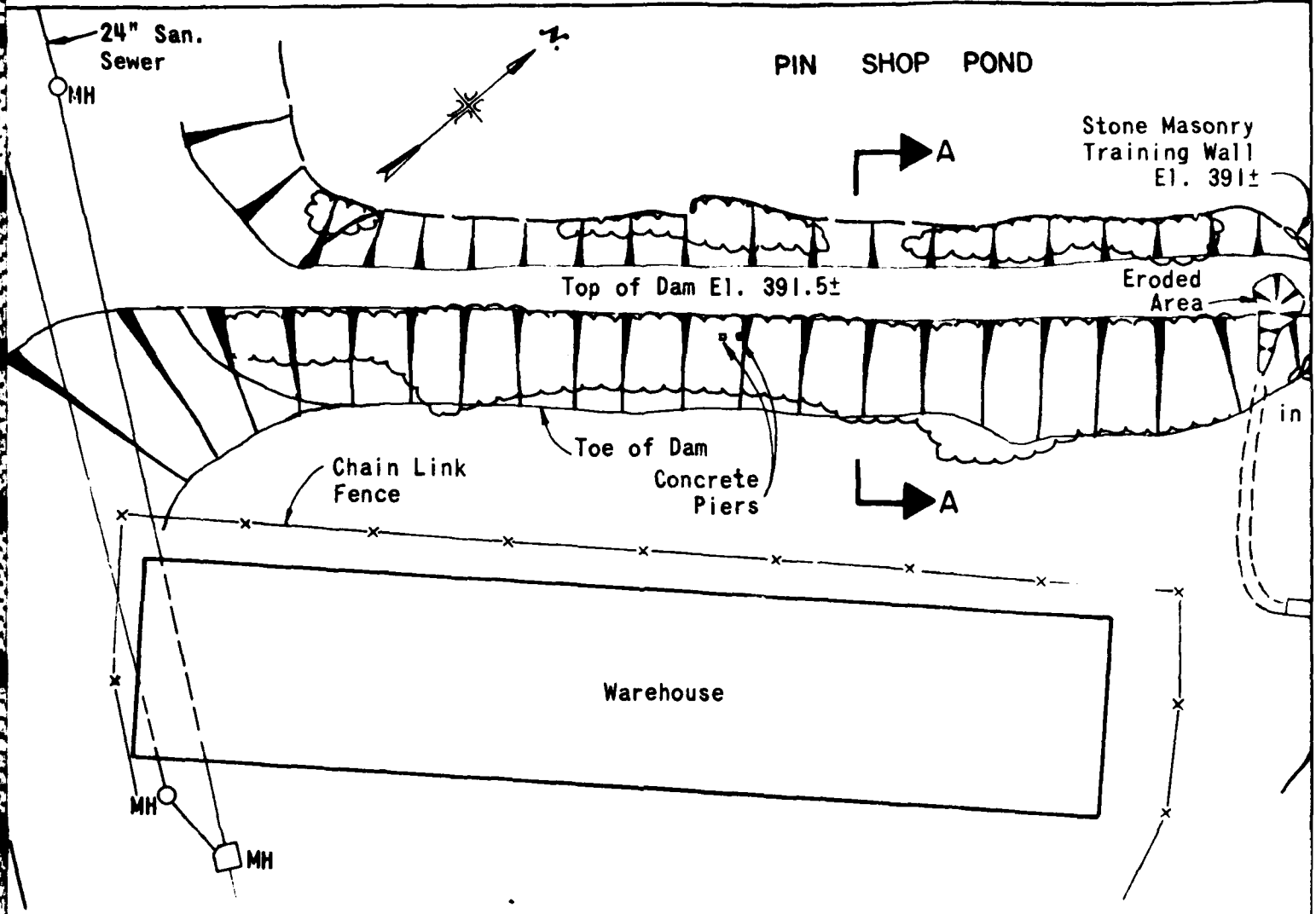
El. 390.1±

2' X 1.5' Openir

SECT

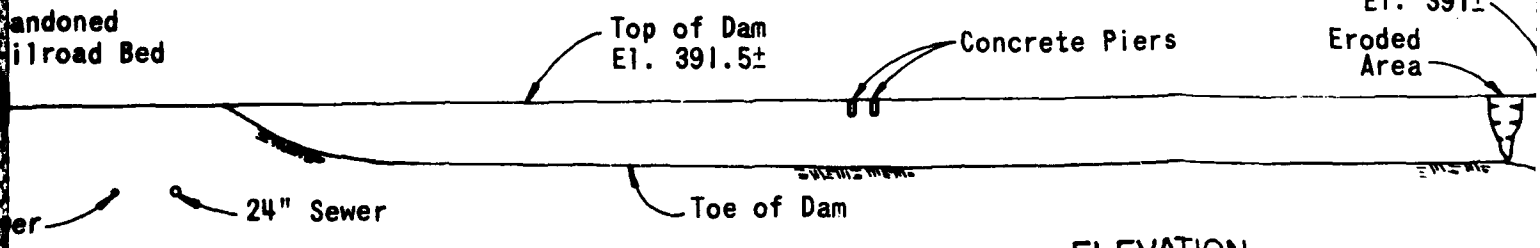
Scale: 1" = 2

(7)



PLAN

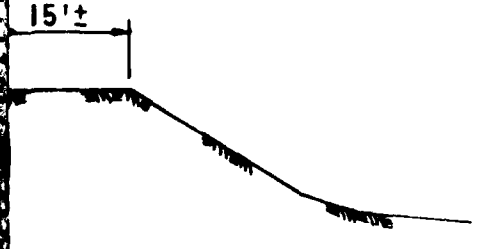
Scale: 1"= 40'



ELEVATION

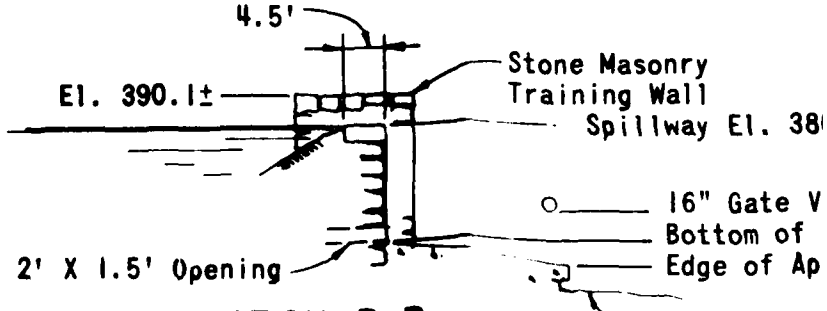
Scale: 1" = 40'

Ste



ECTION A-A

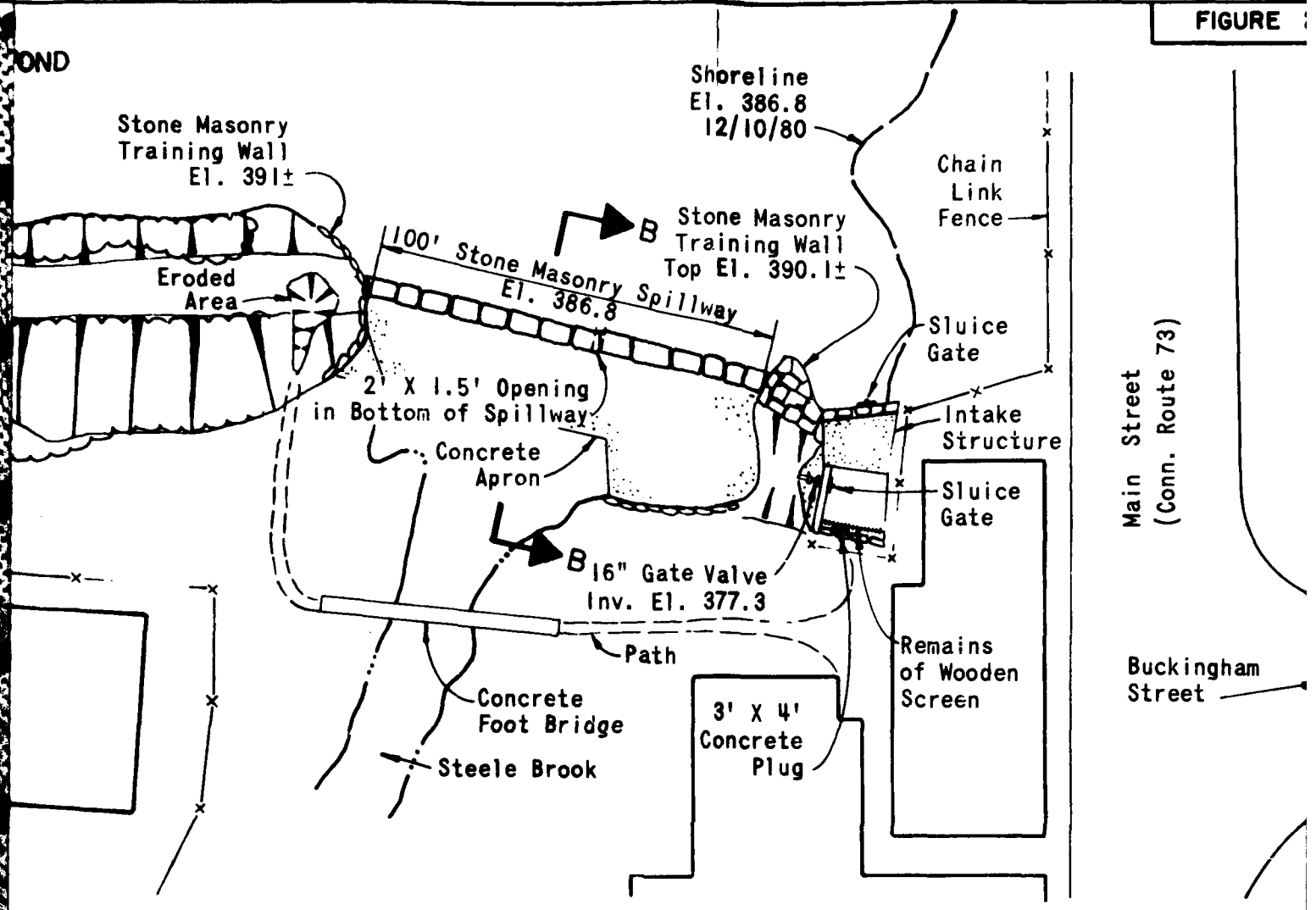
= 20' Horiz. & Vert.

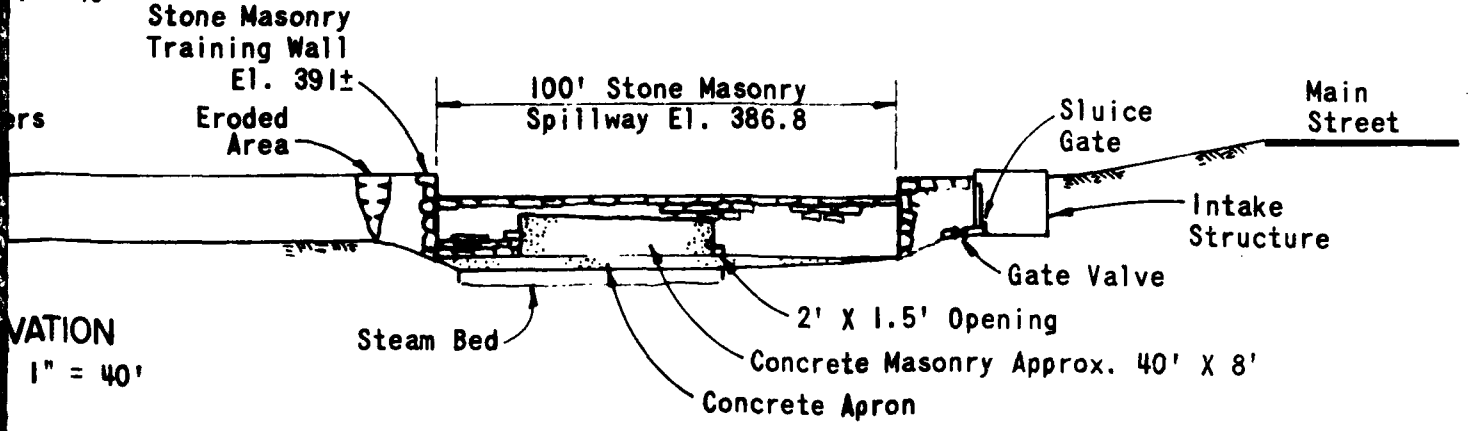


SECTION B-B

Scale: 1" = 20' Horiz. & Vert.

FIGURE





VATION
1" = 40'

Stone Masonry
Training Wall
Spillway El. 386.8

16" Gate Valve Inv. El. 377.3
Bottom of Spillway El. 374
Edge of Apron El. 371.5
Stream Bed El. 368.8

Vert.

3

ROALD HAESTAD, INC CONSULTING ENGINEERS WATERBURY, CONNECTICUT	U.S. ARMY ENGINEER DIV NEW ENGL CORPS OF ENGINEERS WALTHAM, MASS

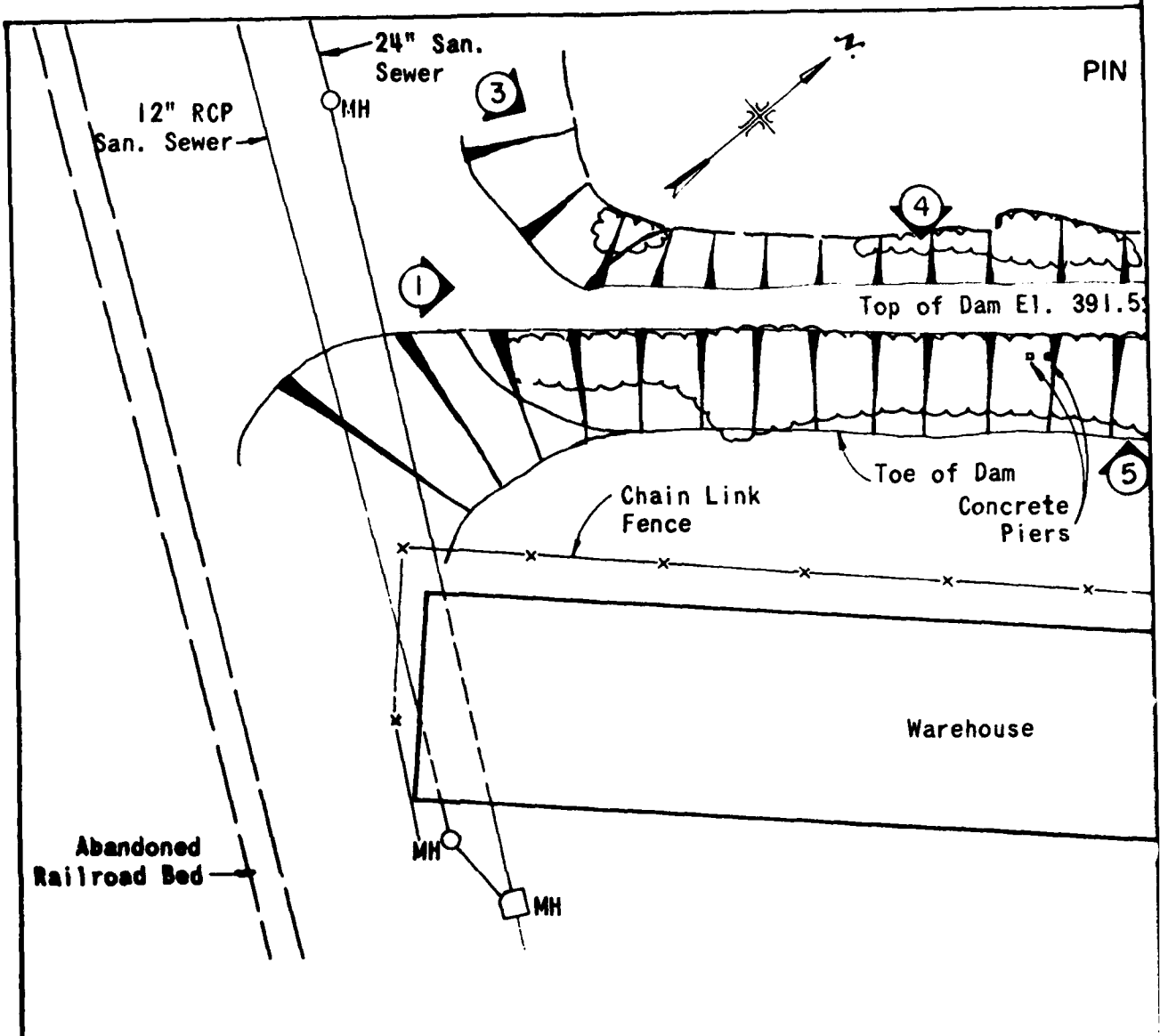
NATIONAL PROGRAM OF INSPECTION OF NON-FED DA

PIN SHOP POND DAM

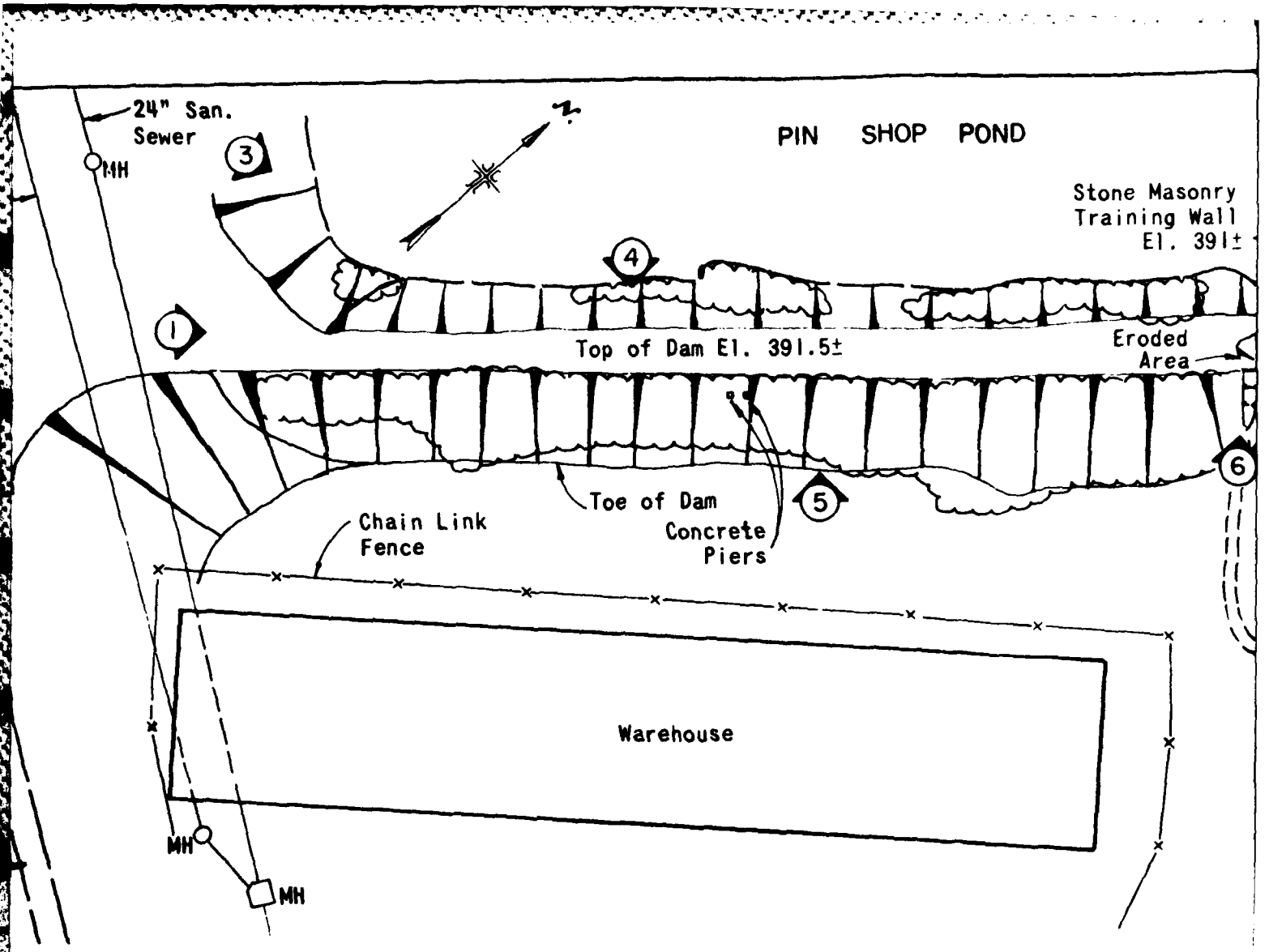
DRAWN	CHECKED	APPROVED	SCALES As Noted
JRS	RGL	PH	DATE 1/81 PAGE B

APPENDIX C

PHOTOGRAPHS

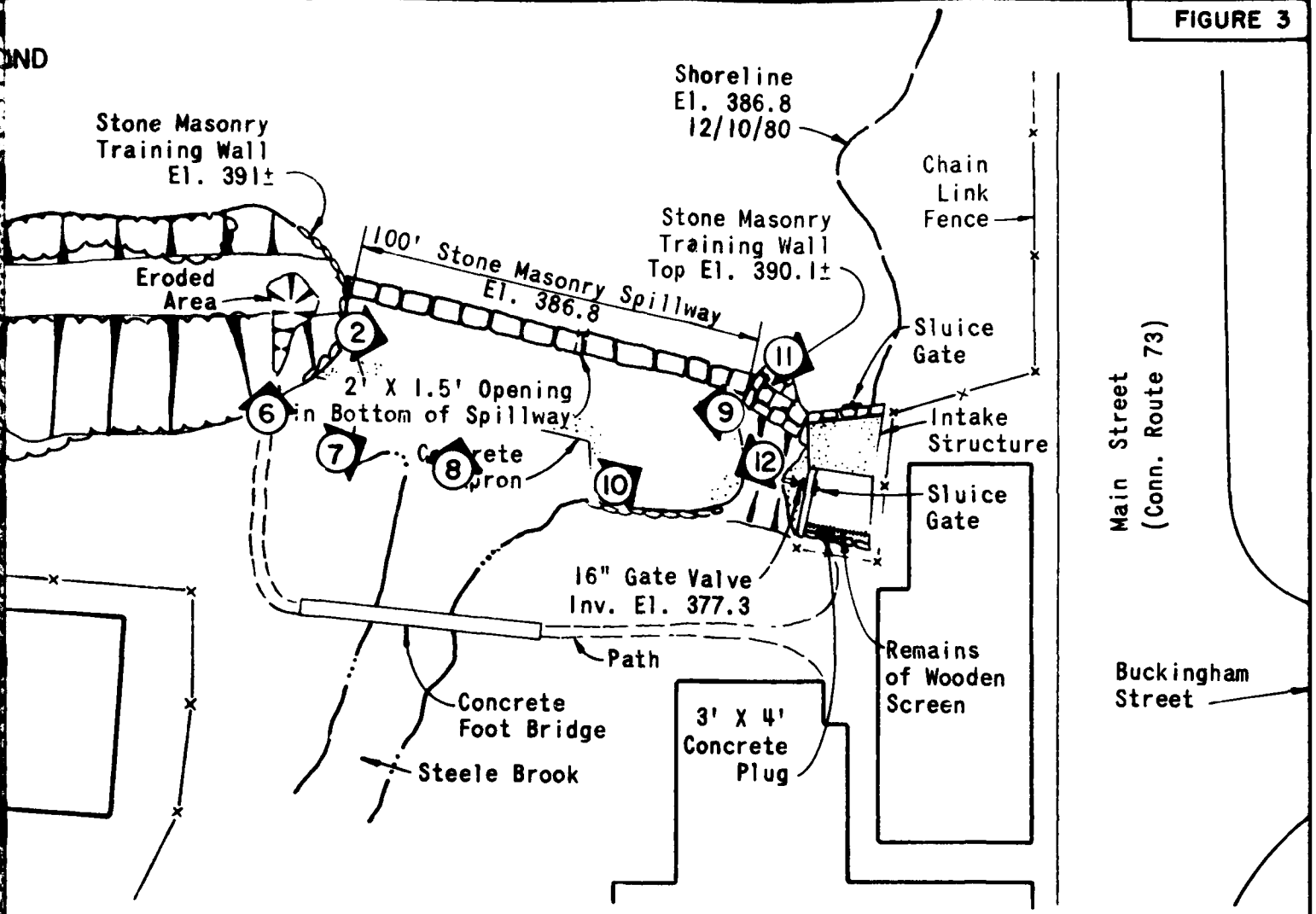


Denotes photo number and direction in which photo was taken.



oto number and
which photo was

FIGURE 3



ROALD HAESTAD, INC CONSULTING ENGINEERS WATERBURY, CONNECTICUT	US ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

PHOTO LOCATION PLAN
PIN SHOP POND DAM
WATERTOWN, CONNECTICUT

DRAWN	CHECKED	APPROVED	SCALES	1" = 40'
JRS	DLS	RH	DATE 1/81	PAGE C-1

(3)

PHOTO NO. 1

EARTH EMBANKMENT FROM RIGHT ABUTMENT.
NOTE TREES ON SLOPES AND CREST AND EROSION PATH.

PHOTO NO. 2

OVERFLOW SPILLWAY AND OUTLET WORKS AT
LEFT ABUTMENT. NOTE 16-INCH GATE VALVE
DISCHARGING BELOW SPILLWAY.

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	PIN SHOP POND DAM STEELE BROOK WATERTOWN, CONNECTICUT CT 00127 15 DECEMBER '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 3

UPSTREAM SLOPE FROM RIGHT ABUTMENT.
NOTE TREES.

PHOTO NO. 4

EROSION OF UPSTREAM SLOPE AT AND
ABOVE WATER LINE.

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	PIN SHOP POND DAM STEELE BROOK WATERTOWN, CONNECTICUT CT 00127 15 DECEMBER '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 5

TREES ON DOWNSTREAM SLOPE OF DAM

PHOTO NO. 6

EROSION GULLY AT LEFT END OF
EARTH EMBANKMENT.

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	PIN SHOP POND DAM STEELE BROOK WATERTOWN, CONNECTICUT CT 00127 15 DECEMBER '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 7

SPILLWAY SECTION. NOTE CONCRETE PORTION OF DOWNSTREAM FACE (LEFT SIDE IN PHOTO), ORANGE STAIN ON APRON AT 2' X 1.5' OPENING AT BASE OF SPILLWAY AND UNDERMINING OF APRON.

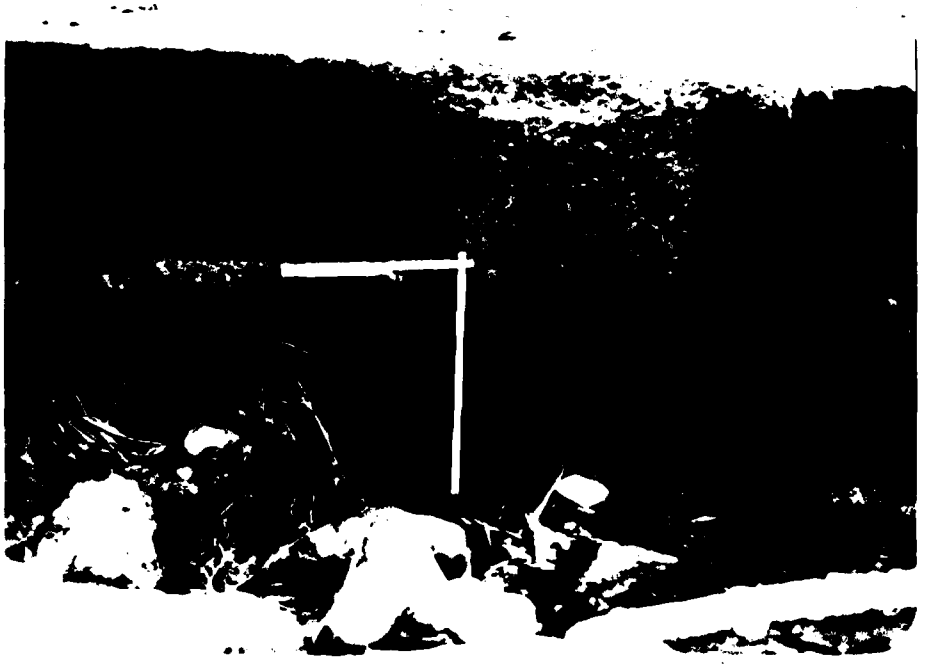


PHOTO NO. 8

UNDERMINING OF SPILLWAY APRON.

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	PIN SHOP POND DAM STEELE BROOK WATERTOWN, CONNECTICUT CT 00127 15 DECEMBER '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 9

RIGHT TRAINING WALL AND DOWNSTREAM SLOPE OF EARTH EMBANKMENT. NOTE TREES BEHIND WALL AND WAREHOUSE BUILDING IMMEDIATELY DOWNSTREAM OF DAM.

PHOTO NO. 10

LEFT TRAINING WALL. NOTE OPEN JOINTS IN STONE MASONRY AND VEGETATION GROWING IN JOINTS.

U.S.ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	PIN SHOP POND DAM STEELE BROOK WATERTOWN, CONNECTICUT CT 00127 15 DECEMBER '80
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 11

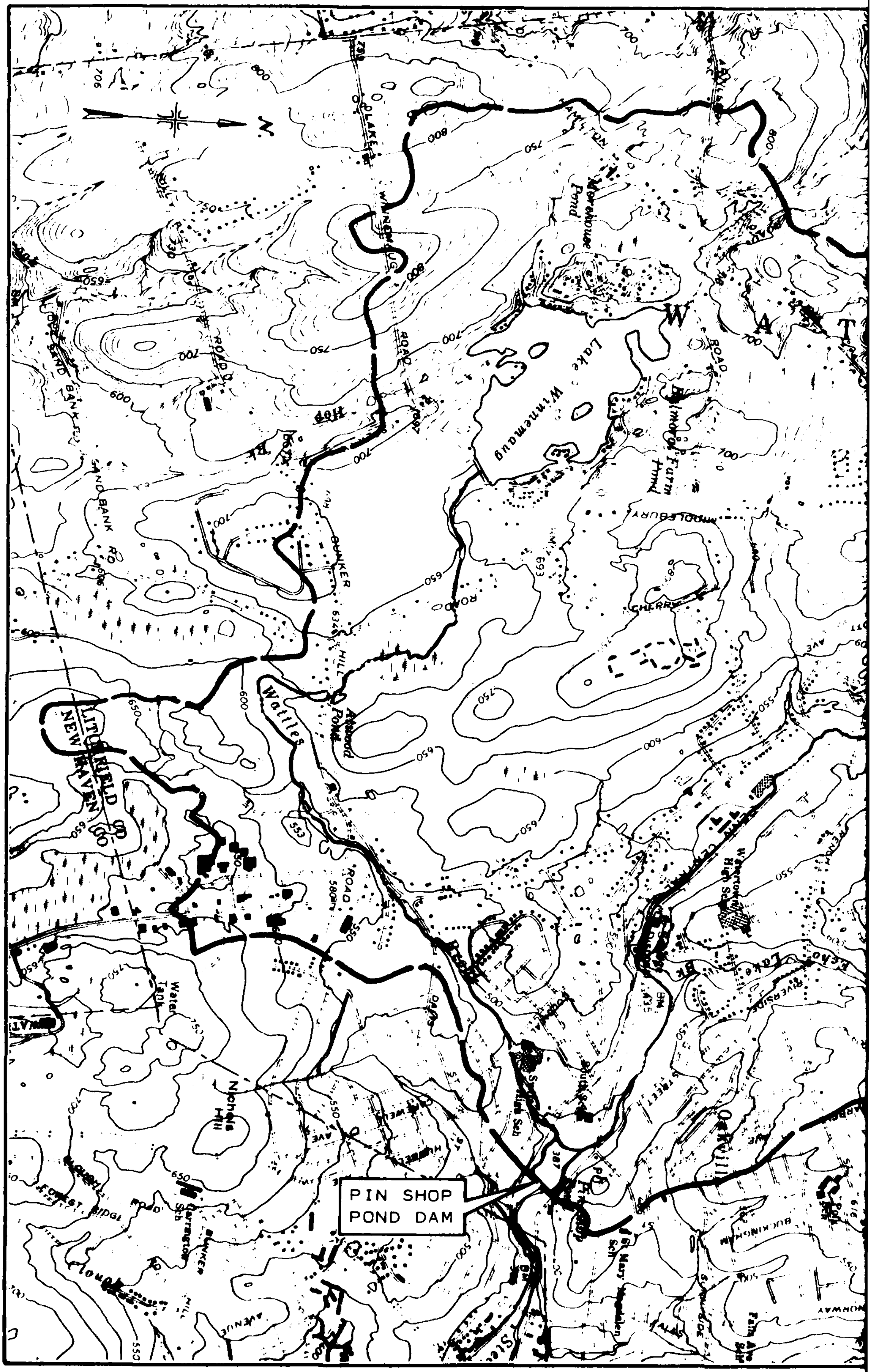
OPERATING MECHANISM FOR INTAKE SLUICE GATE.

PHOTO NO. 12

RIVER CHANNEL AND FOOTBRIDGE DOWNSTREAM OF DAM

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS


PIN SHOP
POND DAM
Lake Winnemaug
LITCHFIELD CO
NEW HAVEN CO
Morehouse Pond
Wattles
Nichols Hill
Water Tank

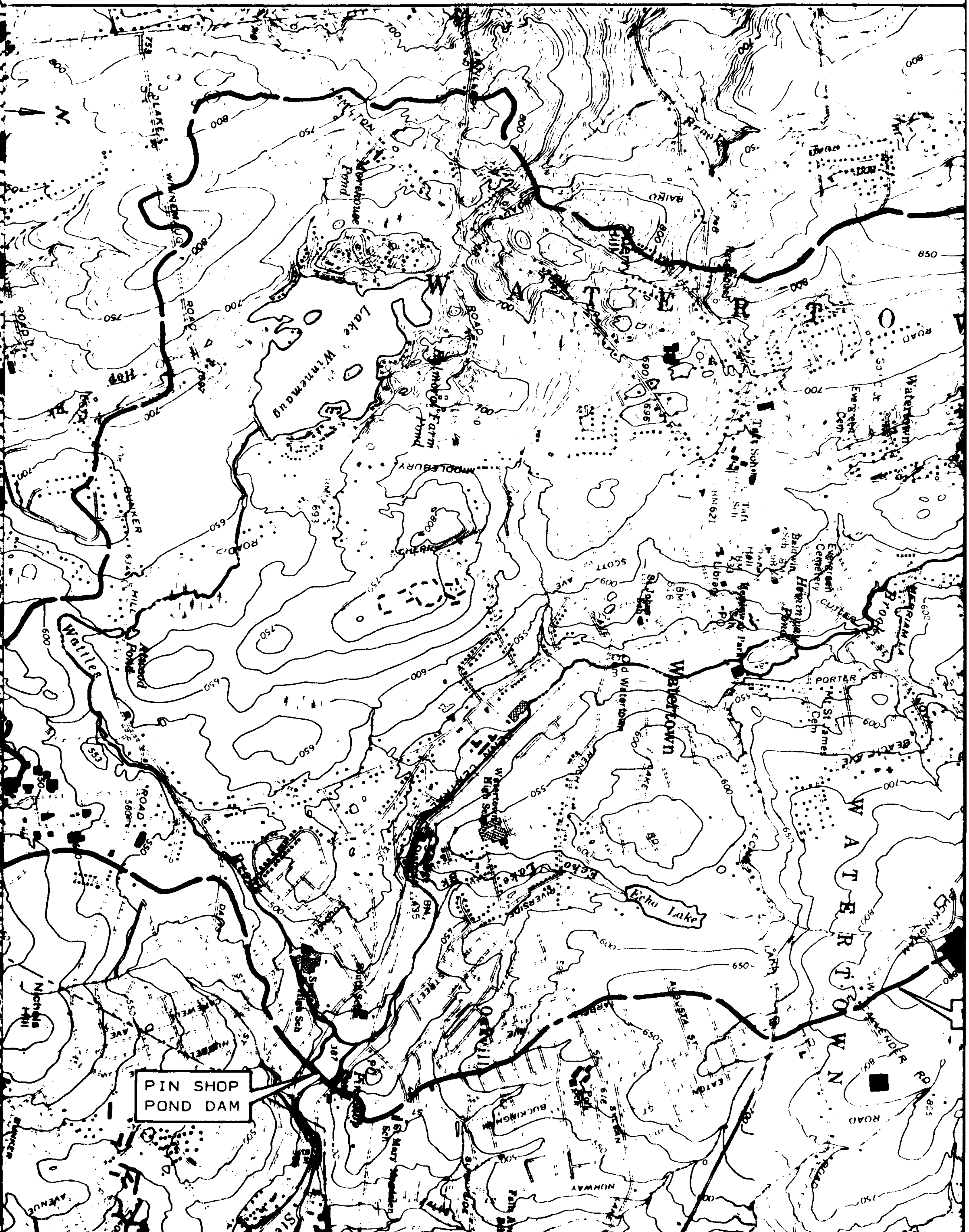
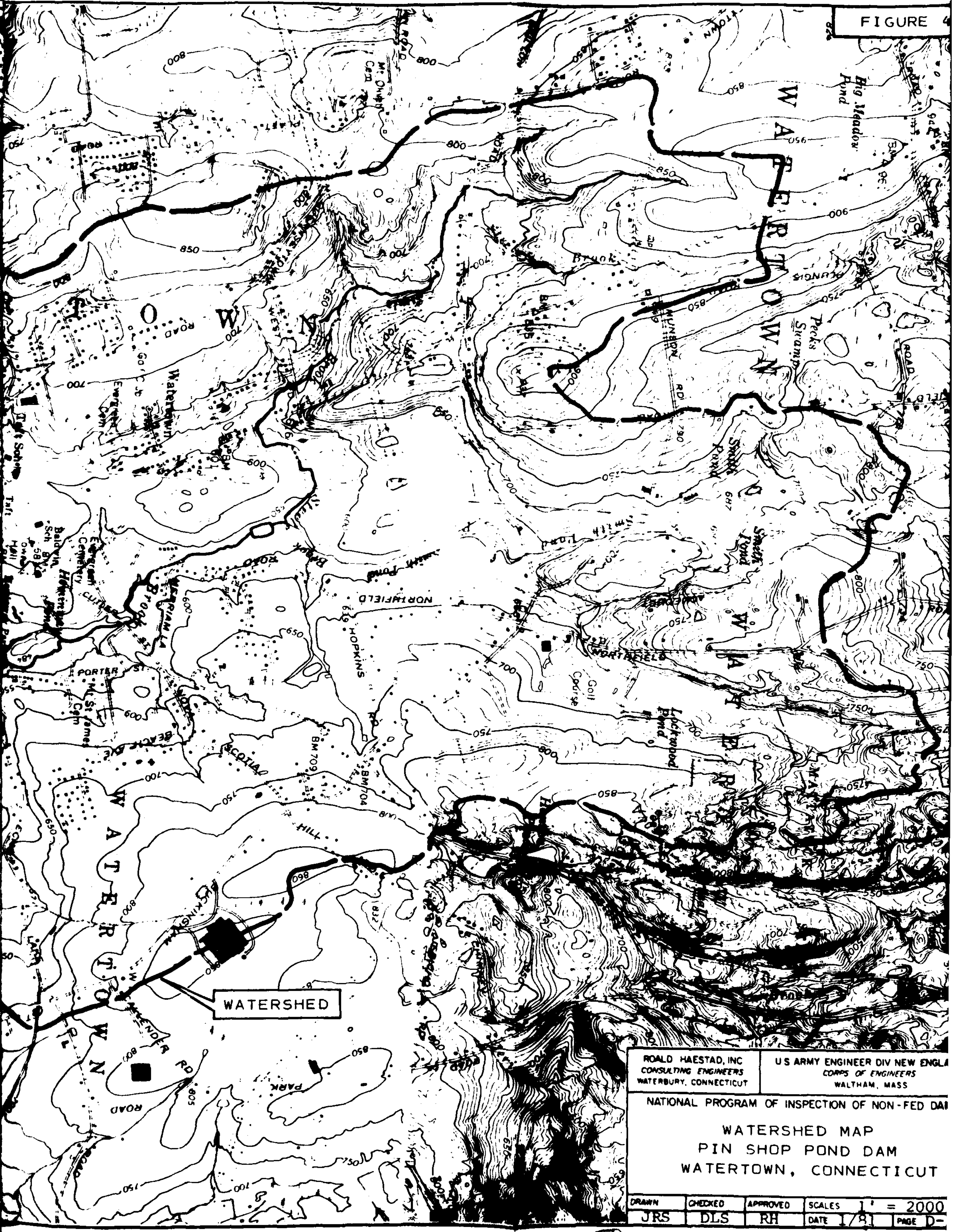

PIN SHOP
POND DAM
WATERTOWN
Lake Winnemaug
Morehouse Pond
Echo Lake
Watertown
Atwood Pond
Wattles
Hop Bk
Nichols Hill
Watertown High Sch
Evergreen Cemetery
Heminway Pond
MIDDLEBURY
BUCKINGHAM
NORWAY
ROAD

FIGURE 4



ROALD HAESTAD, INC CONSULTING ENGINEERS WATERBURY, CONNECTICUT	U.S. ARMY ENGINEER DIV NEW ENGLA CORPS OF ENGINEERS WALTHAM, MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED DA

WATERSHED MAP
PIN SHOP POND DAM
WATERTOWN, CONNECTICUT

DRAWN	CHECKED	APPROVED	SCALES 1" = 2000
JRS	DLS	RH	DATE 1/81 PAGE D-

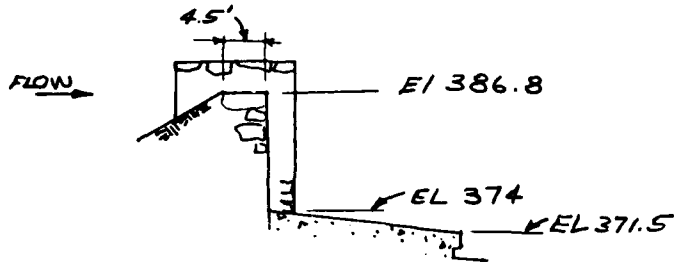
BY SAL DATE 12/24/80 **ROALD HAESTAD, INC.** SHEET NO 1 OF 24

CONSULTING ENGINEERS

CKD BY DLS DATE 12/30/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-033

SUBJECT PIN SHOP POND DAM - Project discharge capacity

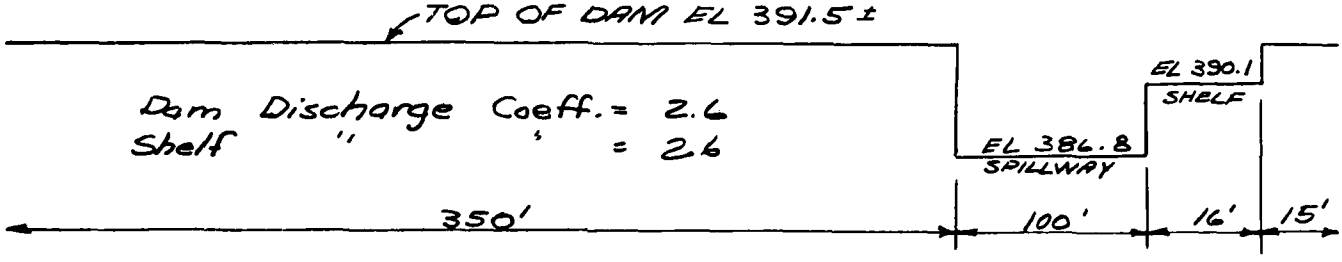
Spillway Section: (Scale 1" = 20' H & V)



Spillway Length = 100'
Discharge Coeff = 3.1

Formula:
$Q = CLH^{3/2}$

Dam Profile: (Not to Scale)



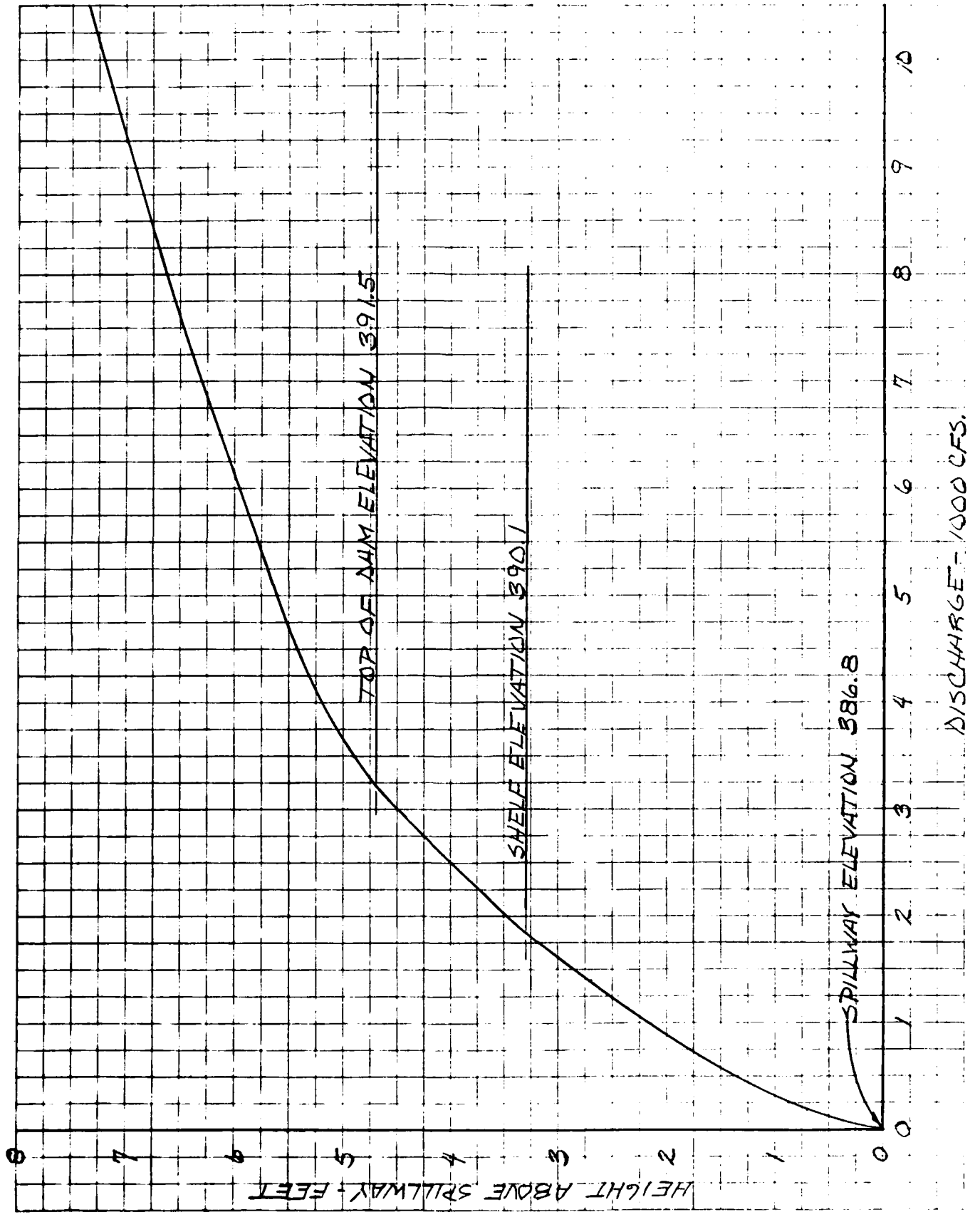
ELEVATION (FEET)	DISCHARGE CAPACITIES SPILLWAY (CFS)	SHELF (CFS)	TOP OF DAM (CFS)	TOTAL DISCH. CAPACITY (CFS)
386.8	0	0	0	0
387.5	182	0	0	182
388.5	687	0	0	687
389.5	1,375	0	0	1,375
390.1	1,858	0	0	1,858
390.5	2,206	11	0	2,206
391.5	3,159	69	0	3,228
392.5	4,219	155	949	5,323
393.5	5,376	261	2,684	8,321
394.5	6,624	384	4,931	11,939

BY LFG DATE 12-31-80 **ROALD HAESTAD, INC.** SHEET NO 2 OF 24

CONSULTING ENGINEERS

CKD BY SAL DATE 12-31-80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-083

SUBJECT PIN SHOP POND DAM - PROJECT DISCHARGE CAPACITY CURVE



BY LBG DATE 12-17-80 **ROALD HAESTAD, INC.** SHEET NO 3 OF 24

CONSULTING ENGINEERS

CKD BY SAL DATE 12-31-80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 77-033

SUBJECT PIN SHOP POND DAM - SURCHARGE STORAGE CAPACITY

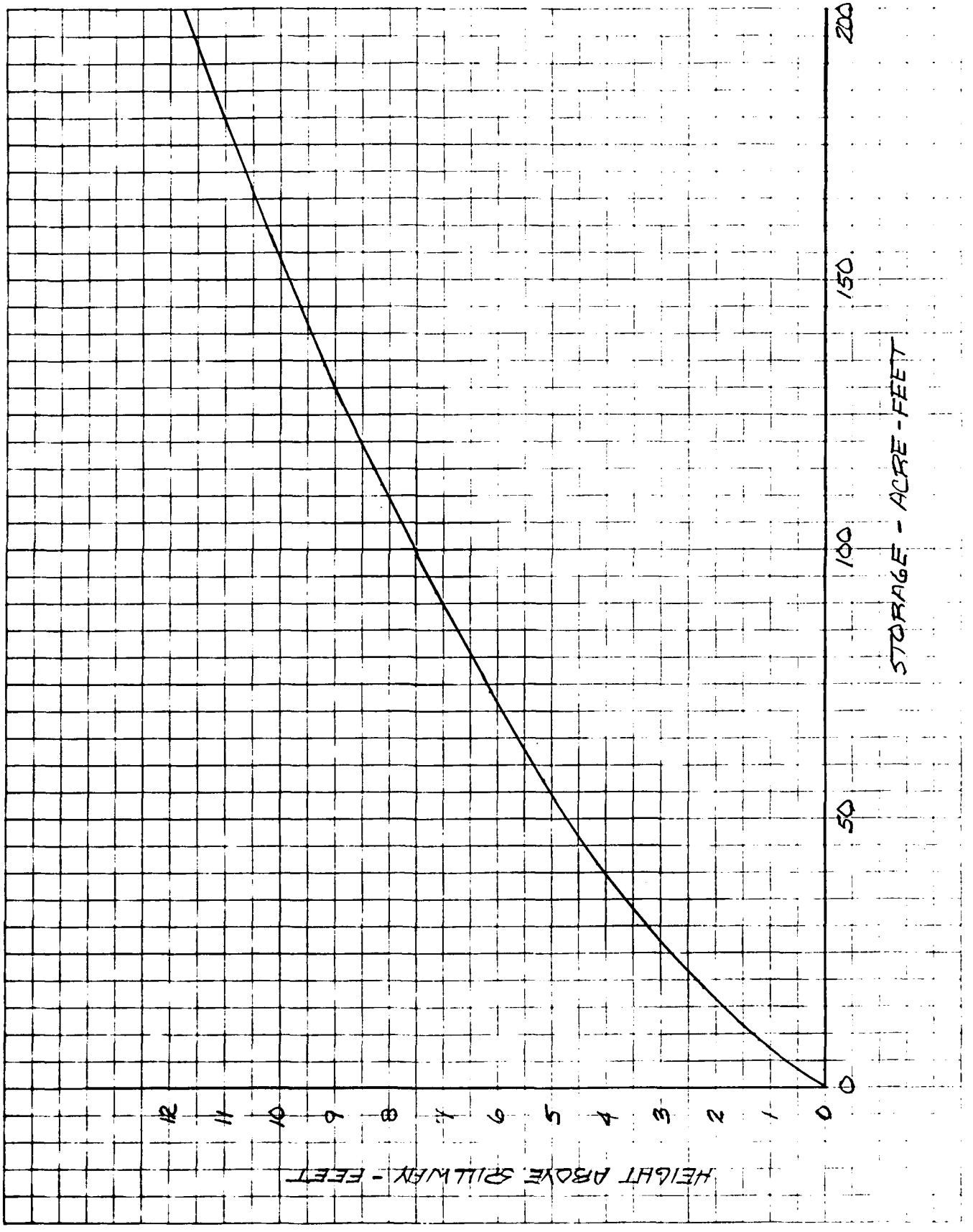
ELEVATION (FEET)	SURFACE AREA (ACRES)	AVERAGE SURFACE AREA (ACRES)	STORAGE CAPACITY (ACRE-FEET)
386.8	6.4		0
		7.5	
388	8.6		9.0
		9.4	
389	10.2		18.4
		11.05	
390	11.9		29.5
		12.82	
391	13.74		42.3
		14.66	
392	15.58		57.0
		16.5	
393	17.42		73.4
		18.34	
394	19.26		91.8
		20.18	
395	21.1		112.0
		22.02	
396	22.94		134.0
		23.86	
397	24.78		157.8
		25.7	
398	26.62		183.5
		27.54	
399	28.46		211.1
		29.38	
400	30.3		240.5

BY LBG DATE 12-17-80. **ROALD HAESTAD, INC.** SHEET NO 4 OF 24

CONSULTING ENGINEERS

CKD BY SAL DATE 12-31-80. 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-033

SUBJECT PIN SHOP POND DAM — SURCHARGE STORAGE CAPACITY CURVE



BY DLS DATE 12/30/80. **ROALD HAESTAD, INC.** SHEET NO. 5 OF 24

CONSULTING ENGINEERS

CKD BY SAL DATE 12/31/80. 37 Brookside Road - Waterbury, Conn. 06708 JOB NO. 49-033

SUBJECT PIN SHOP POND - TEST FLOOD 1/2 PMF

FREEBOARD = 4.7 Feet

SPILLWAY CAPACITY = 3228 cfs

STORAGE CAPACITY = 6.4 ACRES x 5 FT. AVE. DEPTH + SURCHARGE STORAGE

= 32 Ac-Ft. + 50 Ac-FT.

= 82 Ac-FT.

SMALL - HIGH HAZARD USE 1/2 PMF

WATERSHED AREA = 11.9 square miles

USING CORPS OF ENG. CHART FOR "ROLLING" TERRAIN

MPF = 1600 CSM

PMF = 1600 x 11.9 sq. mi. = 19,040 cfs

1/2 PMF = 1/2 (19,040) = 9,520 cfs

NOTE: Inflow and outflow would be essentially equal because of the small storage capacity of the impoundment in comparison to the size of the watershed.

Spillway capacity = 3228 cfs / 9520 cfs X 100

= 34% of 1/2 PMF

S = Storage at time of failure with water level at top of dam

S = Storage at spillway level + Surcharge Storage

S = (Ave. depth x Surface Area) + Surcharge Storage

S = (6.4 Acres x 5 feet) + 50 Acre-Feet

S = 32 Ac-Ft + 50 Ac-Ft = 82 Acre-Feet

Q_{pl} = Peak Failure Outflow = $8/27\ W_b \sqrt{g}\ Y_o^{3/2}$

W_b = Breach width - 40% of dam length across river at mid height = 0.4(390) = 156'

Y_o = Total height from river bed to pool level at time of failure = 23'

$Q_{pl} = 8/27\ (156)\ \sqrt{32.2}\ (23)^{3/2}$

= 28,931 use 28,900 cfs

Note: Dam breach was assumed to include the spillway so that spillway discharge was not added to the dam breach flow.

BY SAL DATE 1/5/81 ROALD HAESTAD, INC. SHEET NO 7 OF 24

CKD BY DLS DATE 1/5/81 CONSULTING ENGINEERS JOB NO. 049 033

SUBJECT PIN SHOP POND DAM-FLOOD ROUTING AT TOP OF DAM

SECTION NUMBER 1

TOTAL SECTION

H (FT)	W (FT)	A (SQ-FT)	R (FT)	S (FT/FT)	V (FT/SEC)	Q (CFS)
1.0	35	31	0.88	0.0238	4.20	129
2.0	46	70	1.51	0.0238	6.04	422
3.0	55	118	2.13	0.0238	7.60	895
4.0	58	171	2.92	0.0238	9.37	1600
5.0	62	226	3.66	0.0238	10.89	2458
6.0	65	283	4.35	0.0238	12.23	3458
7.0	68	342	5.01	0.0238	13.43	4590
8.0	71	403	5.64	0.0238	14.53	5852
9.0	74	465	6.29	0.0238	15.62	7272
10.0	77	529	6.91	0.0238	16.64	8806
11.0	79	594	7.51	0.0238	17.59	10450
12.0	82	660	8.09	0.0238	18.47	12200
13.0	84	728	8.64	0.0238	19.31	14053
14.0	87	796	9.19	0.0238	20.12	16021
15.0	89	866	9.72	0.0238	20.89	18085
16.0	91	936	10.24	0.0238	21.62	20241
17.0	94	1008	10.73	0.0238	22.31	22489
18.0	96	1080	11.22	0.0238	22.98	24826
19.0	99	1154	11.64	0.0238	23.54	27176
20.0	102	1230	12.05	0.0238	24.09	29627
21.0	105	1307	12.45	0.0238	24.63	32180
22.0	108	1385	12.84	0.0238	25.15	34836
23.0	111	1466	13.23	0.0238	25.65	37594
24.0	114	1548	13.58	0.0238	26.09	40383

MANNING COEFFICIENT=N=0.0500
STORAGE AT TIME OF FAILURE=S= 82 AC. FT.
LENGTH OF REACH=L= 1300 FT

INFLOW INTO REACH=QP1= 28900 CFS
DEPTH OF FLOW=H1= 19.7 FT.
CROSS SECTIONAL AREA=A1= 1207 SQ.FT.
STORAGE IN REACH=V1= 28.0 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL)= 19040 CFS
TRIAL DEPTH OF FLOW=H(TRIAL)= 15.4 FT.
TRIAL CROSS SECTIONAL AREA=A(TRIAL)= 897 SQ.FT.
TRIAL STORAGE IN REACH=V(TRIAL)= 18.7 AC. FT.

REACH OUTFLOW=QP2= 20671 CFS
DEPTH OF FLOW=H2= 16.2 FT.

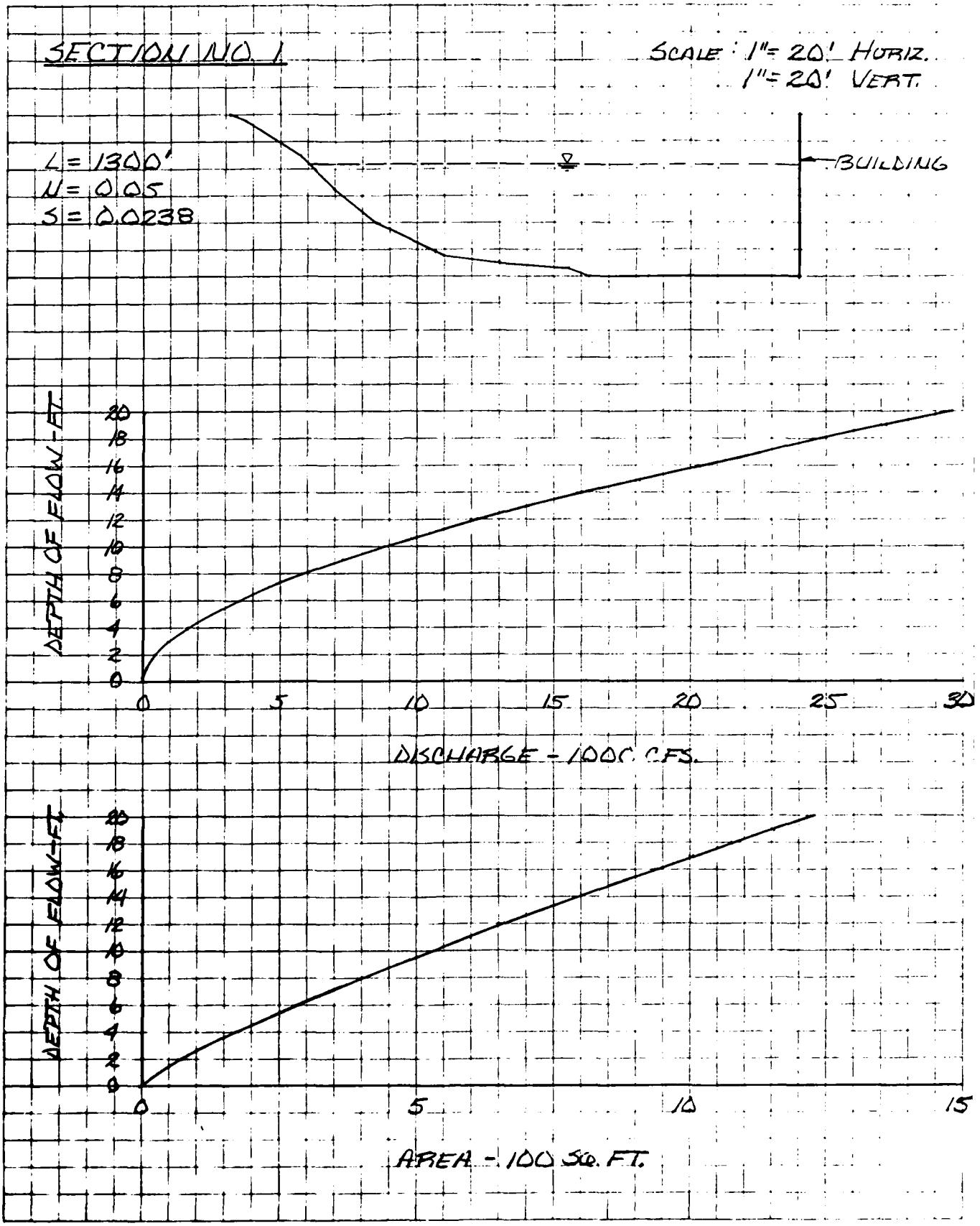
REACH OUTFLOW=QP2= 21208 CFS
DEPTH OF FLOW=H2= 16.4 FT.

BY LBG DATE 12-31-80 **ROALD HAESTAD, INC.** SHEET NO 8 OF 24

CONSULTING ENGINEERS

CKD BY SAL DATE 1-5-81 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-003

SUBJECT PIN SHOP POND DAM - FLOOD ROUTING



SECTION NUMBER 2

FALLS AVENUE
(STORAGE CAPACITY WITHIN REACH)

HEIGHT (FEET)	SURFACE AREA (ACRES)	STORAGE VOLUME (ACRE-FEET)
1.0	0.05	0.0
2.0	0.10	0.1
3.0	0.15	0.2
4.0	0.20	0.4
5.0	0.36	0.7
6.0	0.52	1.1
7.0	0.68	1.7
8.0	0.84	2.5
9.0	1.00	3.4
10.0	1.16	4.5
11.0	1.32	5.7
12.0	1.48	7.1
13.0	1.64	8.7
14.0	1.80	10.4
15.0	2.08	12.3
16.0	2.36	14.6
17.0	2.64	17.1
18.0	2.92	19.8
19.0	3.20	22.9
20.0	3.48	26.2
21.0	3.76	29.9
22.0	4.04	33.8
23.0	4.32	37.9
24.0	4.60	42.4
25.0	4.90	47.1

STORAGE CAPACITY CALCULATED FROM SURFACE AREAS AT KNOWN ELEVATIONS

SUBJECT PIN SHOP POND DAM-FLOOD ROUTING AT TOP OF DAM

SECTION NUMBER 2

FALLS AVENUE

HEIGHT ABOVE INVERT (FEET)	D I S C H A R G E C A P A C I T Y CONDUIT (CFS)	SPILLWAY (CFS)	TOTAL (CFS)
1.0	160	0	160
2.0	320	0	320
3.0	540	0	540
4.0	760	0	760
5.0	1120	0	1120
6.0	1480	0	1480
7.0	1900	0	1900
8.0	2320	0	2320
9.0	2720	0	2720
10.0	3120	0	3120
11.0	3680	0	3680
12.0	4240	0	4240
13.0	4720	0	4720
14.0	5200	0	5200
15.0	5600	700	6300
16.0	6000	1980	7980
17.0	6380	3637	10017
18.0	6760	5600	12360
19.0	7160	8001	15161
20.0	7560	10783	18343
21.0	7780	14049	21829
22.0	8000	17734	25734
23.0	8360	21916	30276
24.0	8720	26532	35252
25.0	8960	31515	40475

STORAGE AT TIME OF FAILURE=S= 82 AC. FT.
LENGTH OF REACH=L= 1000 FT

INFLOW INTO REACH=QP1= 21208 CFS
HEIGHT ABOVE CONDUIT INVERT=H1= 20.8 FT.
STORAGE IN REACH=V1= 24.5 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL)= 14874 CFS
TRIAL HEIGHT ABOVE CONDUIT INVERT=H(TRIAL)= 18.9 FT.
TRIAL STORAGE IN REACH=V(TRIAL)= 17.9 AC. FT.

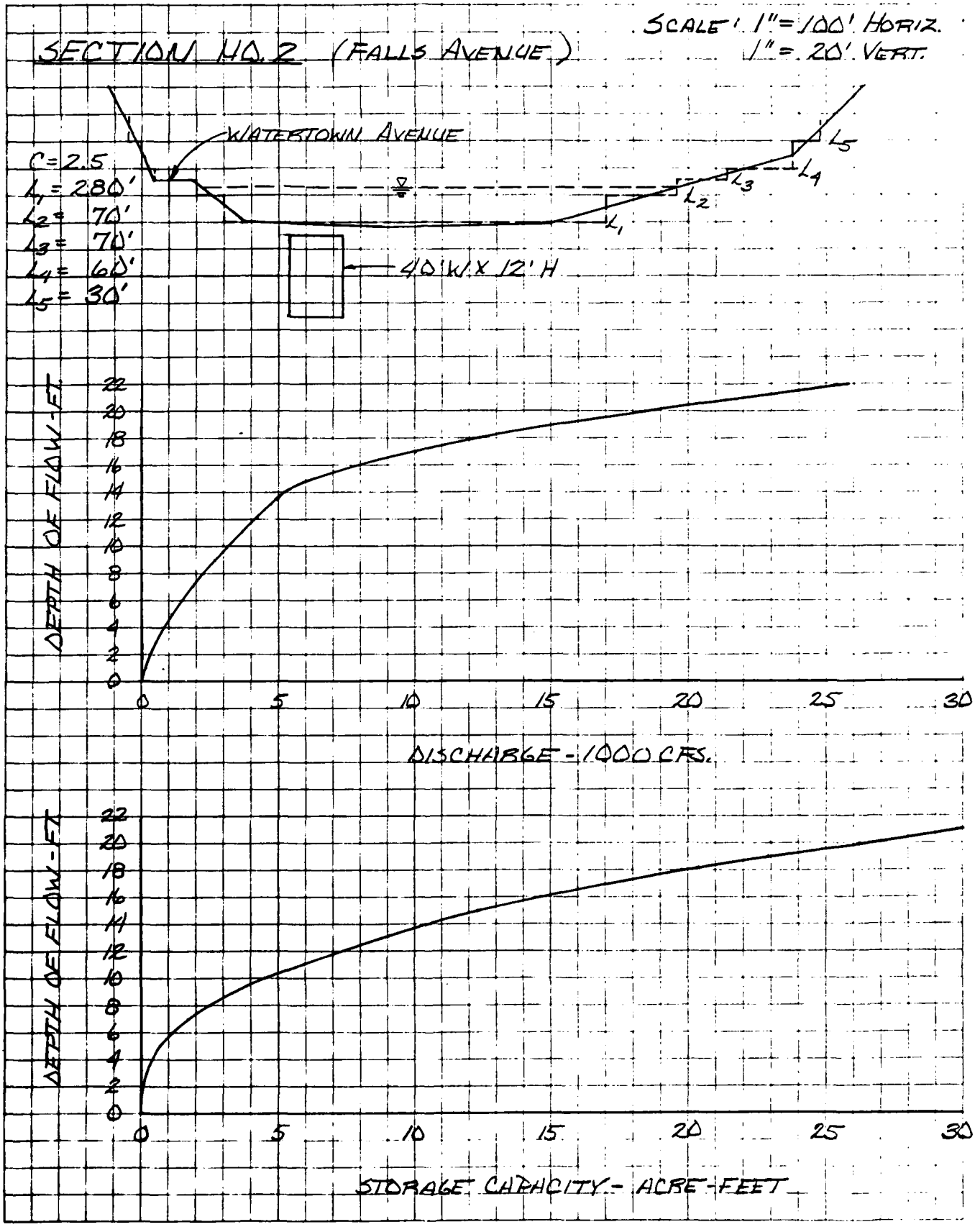
REACH OUTFLOW=QP2= 15731 CFS
HEIGHT ABOVE CONDUIT INVERT=H2= 19.2 FT.

BY LBG DATE 1-5-81 **ROALD HAESTAD, INC.** SHEET NO 11 OF 24

CONSULTING ENGINEERS

CKD BY SAL DATE 1-5-81 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-033

SUBJECT PIN SHOP POND DAM - FLOOD ROUTING



SUBJECT PIN SHOP POND DAM-FLOOD ROUTING AT TOP OF DAM

SECTION NUMBER 3A

MAIN CHANNEL

H (FT)	W (FT)	A (SQ-FT)	R (FT)	S (FT/FT)	V (FT/SEC)	Q (CFS)
1.0	40	33	0.83	0.0080	2.94	97
2.0	50	78	1.55	0.0080	4.45	346
3.0	60	132	2.19	0.0080	5.61	743
4.0	71	197	2.79	0.0080	6.59	1300
5.0	81	272	3.36	0.0080	7.46	2030
6.0	81	352	4.35	0.0080	8.85	3119
7.0	81	432	5.34	0.0080	10.15	4387
8.0	81	512	6.33	0.0080	11.37	5822
9.0	81	592	7.31	0.0080	12.52	7415
10.0	81	672	8.30	0.0080	13.62	9159
11.0	81	752	9.29	0.0080	14.68	11047
12.0	81	832	10.28	0.0080	15.71	13074
13.0	81	912	11.27	0.0080	16.70	15235
14.0	81	992	12.25	0.0080	17.66	17526
15.0	81	1072	13.24	0.0080	18.60	19944

MANNING COEFFICIENT=N=0.0400

SECTION NUMBER 3B

LEFT OVERBANK

H (FT)	W (FT)	A (SQ-FT)	R (FT)	S (FT/FT)	V (FT/SEC)	Q (CFS)
6.0	300	150	0.50	0.0080	0.84	126
7.0	301	450	1.50	0.0080	1.74	782
8.0	302	750	2.48	0.0080	2.44	1828
9.0	303	1050	3.47	0.0080	3.04	3196
10.0	304	1350	4.44	0.0080	3.59	4848
11.0	305	1650	5.41	0.0080	4.10	6758
12.0	306	1950	6.37	0.0080	4.57	8909
13.0	307	2250	7.33	0.0080	5.01	11284
14.0	308	2550	8.28	0.0080	5.44	13871
15.0	309	2850	9.22	0.0080	5.85	16660

MANNING COEFFICIENT=N=0.1000

SUBJECT PIN SHOP POND DAM-FLOOD ROUTING AT TOP OF DAM

SECTION NUMBER 3C

RIGHT OVERBANK

H (FT)	W (FT)	A (SQ-FT)	R (FT)	S (FT/FT)	V (FT/SEC)	Q (CFS)
6.0	8	4	0.50	0.0080	1.04	4
7.0	15	15	0.99	0.0080	1.65	25
8.0	23	34	1.49	0.0080	2.16	73
9.0	30	60	1.98	0.0080	2.62	157
10.0	38	94	2.48	0.0080	3.04	285
11.0	45	135	2.97	0.0080	3.44	464
12.0	53	184	3.47	0.0080	3.81	700
13.0	61	240	3.97	0.0080	4.16	999
14.0	68	304	4.46	0.0080	4.50	1368
15.0	76	375	4.96	0.0080	4.83	1811

MANNING COEFFICIENT=N=0.0800

SUBJECT PIN SHOP POND DAM-FLOOD ROUTING AT TOP OF DAM

SECTION NUMBER 3

TOTAL SECTION

	AREA (SQ.FT.)				DISCHARGE (CFS)			
H	A	B	C	TOTAL	A	B	C	TOTAL
1.0	33	0	0	33	97	0	0	97
2.0	78	0	0	78	346	0	0	346
3.0	132	0	0	132	743	0	0	743
4.0	197	0	0	197	1300	0	0	1300
5.0	272	0	0	272	2030	0	0	2030
6.0	352	150	4	506	3119	126	4	3249
7.0	432	450	15	897	4387	782	25	5194
8.0	512	750	34	1296	5822	1828	73	7723
9.0	592	1050	60	1702	7415	3196	157	10769
10.0	672	1350	94	2116	9159	4848	285	14292
11.0	752	1650	135	2537	11047	6758	464	18269
12.0	832	1950	184	2966	13074	8909	700	22682
13.0	912	2250	240	3402	15235	11284	999	27517
14.0	992	2550	304	3846	17526	13871	1368	32765
15.0	1072	2850	375	4297	19944	16660	1811	38415

STORAGE AT TIME OF FAILURE=S= 82 AC. FT.
LENGTH OF REACH=L= 1000 FT

INFLOW INTO REACH=QP1= 15731 CFS
DEPTH OF FLOW=H1= 10.4 FT.
CROSS SECTIONAL AREA=A1= 2268 SQ.FT.
STORAGE IN REACH=V1= 40.5 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL.)= 7953 CFS
TRIAL DEPTH OF FLOW=H(TRIAL)= 8.1 FT.
TRIAL CROSS SECTIONAL AREA=A(TRIAL)= 1327 SQ.FT.
TRIAL STORAGE IN REACH=V(TRIAL)= 18.9 AC. FT.

REACH OUTFLOW=QP2= 10027 CFS
DEPTH OF FLOW=H2= 8.8 FT.

REACH OUTFLOW=QP2= 10455 CFS
DEPTH OF FLOW=H2= 8.9 FT.

BY LBG DATE 1-5-81 **ROALD HAESTAD, INC.** SHEET NO. 16 OF 24

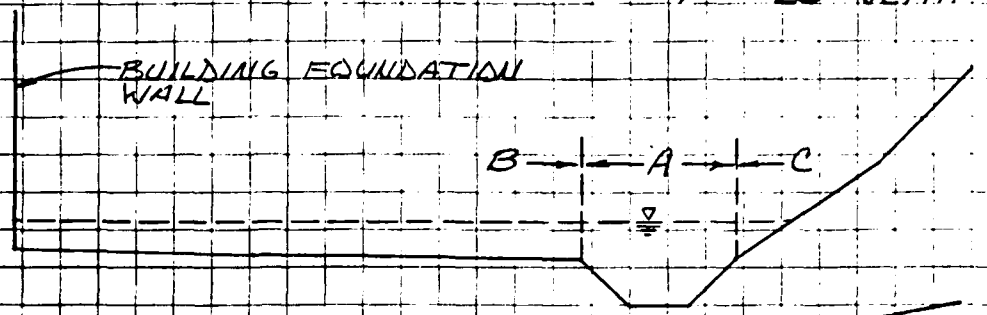
CONSULTING ENGINEERS

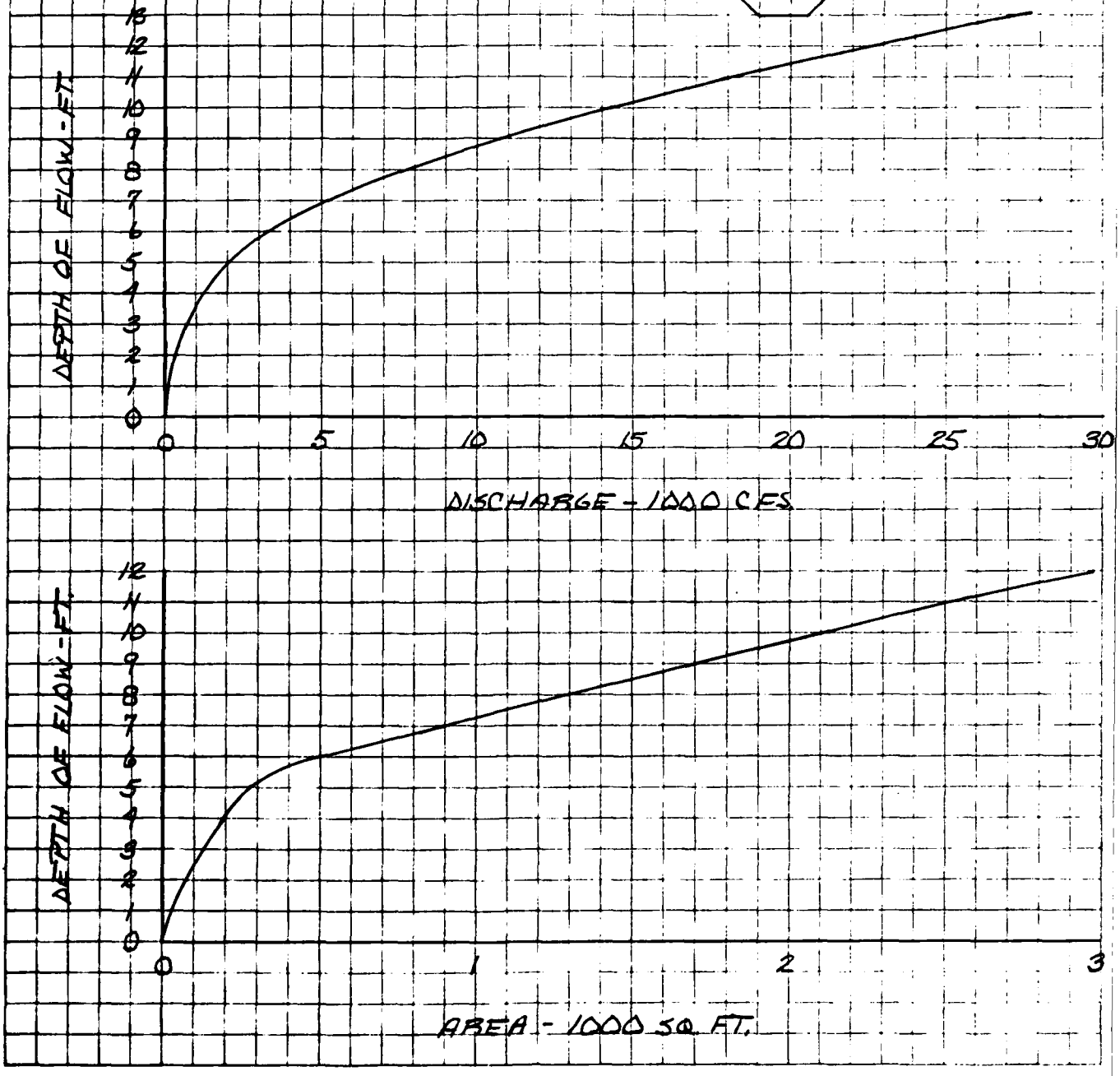
CKD BY SAH DATE 1-5-81 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-023

SUBJECT PINSHOP POND DAM - FLOOD ROUTING

SECTION NO. 3 (BY SHOPPING PLAZA) SCALE: 1" = 100' HORIZ.
1" = 20' VERT.

L = 1300'
N (A) = 0.04
(B) = 0.1
(C) = 0.08
S = 0.008





BY SAL DATE 1/5/81 ROALD HAESTAD, INC. SHEET NO 17 OF 24

CKD BY DLS DATE 1/5/81 CONSULTING ENGINEERS JOB NO. 049 033

SUBJECT PIN SHOP POND DAM-FLOOD ROUTING AT TOP OF DAM

SECTION NUMBER 4A

MAIN CHANNEL

H (FT)	W (FT)	A (SQ-FT)	R (FT)	S (FT/FT)	V (FT/SEC)	Q (CFS)
1.0	34	30	0.88	0.0080	3.06	93
2.0	37	65	1.78	0.0080	4.89	320
3.0	39	102	2.63	0.0080	6.33	649
4.0	41	141	3.44	0.0080	7.57	1070
5.0	43	182	4.21	0.0080	8.66	1579
6.0	46	225	4.94	0.0080	9.64	2173
7.0	48	270	5.65	0.0080	10.54	2851
8.0	50	317	6.34	0.0080	11.38	3612
9.0	52	366	7.00	0.0080	12.16	4457
10.0	55	417	7.65	0.0080	12.90	5386
11.0	57	471	8.22	0.0080	13.54	6371
12.0	60	526	8.78	0.0080	14.14	7446
13.0	63	585	9.34	0.0080	14.73	8614
14.0	65	645	9.88	0.0080	15.30	9875
15.0	68	709	10.42	0.0080	15.85	11234

MANNING COEFFICIENT=N=0.0400

BY SAL DATE 1/5/81 ROALD HAFSTAD, INC. SHEET NO 18 OF 24

CKD BY DLS DATE 1/5/81 CONSULTING ENGINEERS JOB NO. 049 033

SUBJECT PIN SHOP POND DAM-FLOOD ROUTING AT TOP OF DAM

SECTION NUMBER 4B

RIGHT OVERBANK

H (FT)	W (FT)	A (SQ-FT)	R (FT)	S (FT/FT)	V (FT/SEC)	Q (CFS)
2.0	155	145	0.93	0.0080	1.27	184
3.0	161	303	1.88	0.0080	2.03	613
4.0	167	466	2.80	0.0080	2.64	1230
5.0	172	635	3.69	0.0080	3.17	2015
6.0	178	810	4.55	0.0080	3.65	2957
7.0	184	990	5.39	0.0080	4.09	4047
8.0	189	1176	6.21	0.0080	4.49	5283
9.0	195	1368	7.01	0.0080	4.87	6660
10.0	201	1565	7.79	0.0080	5.23	8177
11.0	206	1768	8.59	0.0080	5.57	9850
12.0	211	1975	9.36	0.0080	5.90	11660
13.0	216	2188	10.12	0.0080	6.22	13606
14.0	221	2405	10.87	0.0080	6.52	15689
15.0	226	2628	11.61	0.0080	6.82	17908

MANNING COEFFICIENT=N=0.1000

SUBJECT PIN SHOP POND DAM-FLOOD ROUTING AT TOP OF DAM

SECTION NUMBER 4

TOTAL SECTION

	AREA (SQ.FT.)			DISCHARGE (CFS)		
H	A	B	TOTAL	A	B	TOTAL
1.0	30	0	30	93	0	93
2.0	65	145	210	320	184	503
3.0	102	303	405	649	613	1262
4.0	141	466	608	1070	1230	2301
5.0	182	635	818	1579	2015	3594
6.0	225	810	1035	2173	2957	5130
7.0	270	990	1261	2851	4047	6898
8.0	317	1176	1494	3612	5283	8895
9.0	366	1368	1734	4457	6660	11117
10.0	417	1565	1982	5386	8177	13563
11.0	471	1768	2238	6371	9850	16221
12.0	526	1975	2501	7446	11660	19106
13.0	585	2188	2772	8614	13606	22220
14.0	645	2405	3050	9875	15689	25565
15.0	709	2628	3336	11234	17908	29142

STORAGE AT TIME OF FAILURE=S= 82 AC. FT.
LENGTH OF REACH=L= 2000 FT

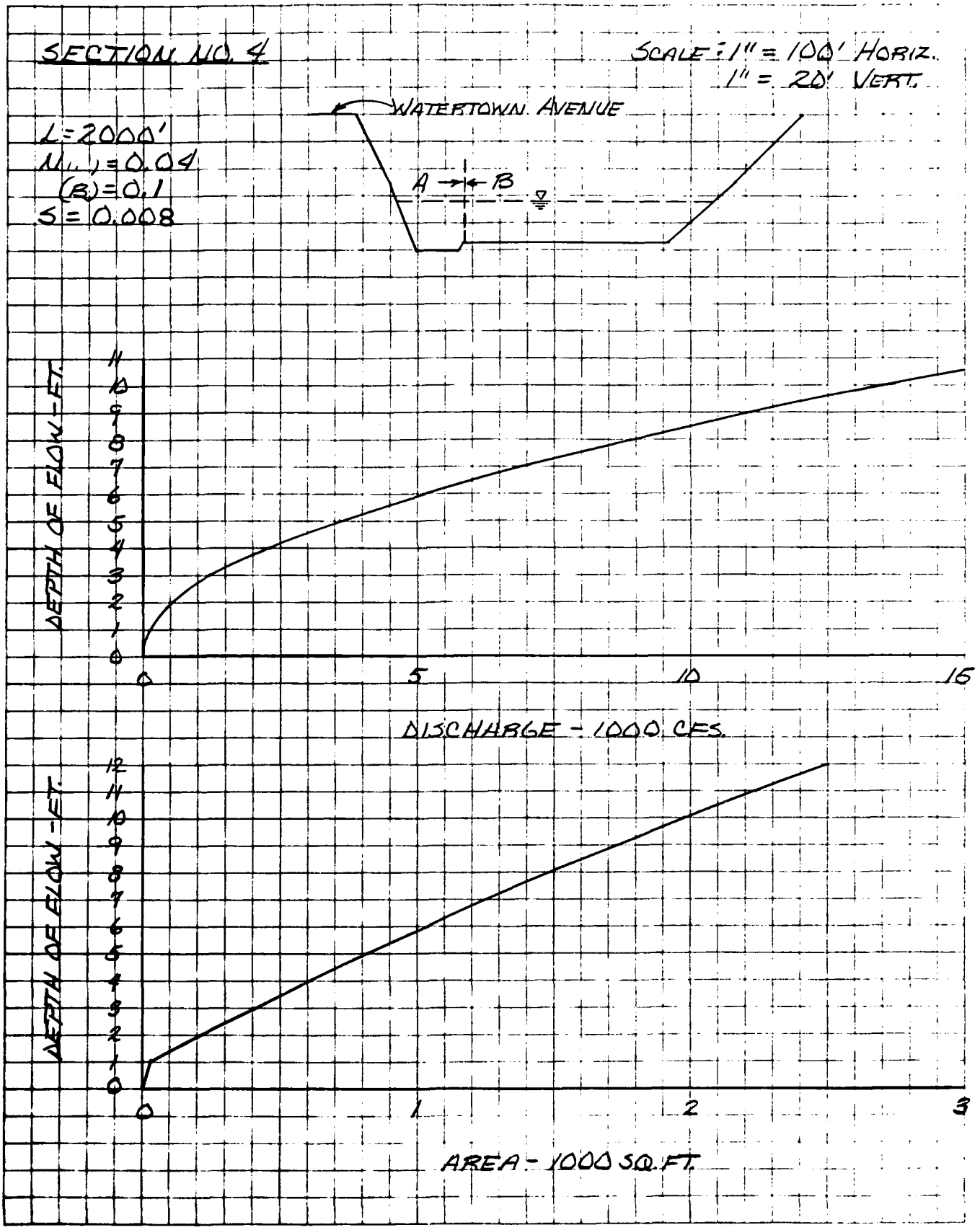
INFLOW INTO REACH=QP1= 10455 CFS
DEPTH OF FLOW=H1= 8.7 FT.
CROSS SECTIONAL AREA=A1= 1663 SQ.FT.
STORAGE IN REACH=V1= 41.5 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL.)= 5162 CFS
TRIAL DEPTH OF FLOW=H(TRIAL.)= 6.0 FT.
TRIAL CROSS SECTIONAL AREA=A(TRIAL.)= 1040 SQ.FT.
TRIAL STORAGE IN REACH=V(TRIAL.)= 12.9 AC. FT.

REACH OUTFLOW=QP2= 6986 CFS
DEPTH OF FLOW=H2= 7.0 FT.

REACH OUTFLOW=QP2= 7220 CFS
DEPTH OF FLOW=H2= 7.2 FT.

SUBJECT PIN SHOP POND DAM - FLOOD ROUTING



SECTION NUMBER 5

TOTAL SECTION

H (FT)	W (FT)	A (SQ-FT)	R (FT)	S (FT/FT)	V (FT/SEC)	Q (CFS)
1.0	42	36	0.85	0.0067	2.18	78
2.0	48	80	1.69	0.0067	3.45	277
3.0	53	130	2.45	0.0067	4.43	573
4.0	57	183	3.23	0.0067	5.31	972
5.0	60	239	3.99	0.0067	6.12	1463
6.0	63	297	4.72	0.0067	6.85	2034
7.0	66	357	5.42	0.0067	7.51	2682
8.0	69	420	6.08	0.0067	8.10	3402
9.0	73	486	6.64	0.0067	8.59	4171
10.0	77	555	7.18	0.0067	9.06	5024
11.0	81	627	7.72	0.0067	9.50	5961
12.0	85	704	8.24	0.0067	9.93	6985
13.0	89	783	8.84	0.0067	10.40	8138
14.0	92	863	9.41	0.0067	10.85	9365

MANNING COEFFICIENT=N=0.0500
STORAGE AT TIME OF FAILURE=S= 82 AC. FT.
LENGTH OF REACH=L= 3000 FT

INFLOW INTO REACH=QP1= 7220 CFS
DEPTH OF FLOW=H1= 12.2 FT.
CROSS SECTIONAL AREA=A1= 720 SQ.FT.
STORAGE IN REACH=V1= 21.7 AC. FT.

TRIAL REACH OUTFLOW=QP(TRIAL)= 5312 CFS
TRIAL DEPTH OF FLOW=H(TRIAL)= 10.3 FT.
TRIAL CROSS SECTIONAL AREA=A(TRIAL)= 577 SQ.FT.
TRIAL STORAGE IN REACH=V(TRIAL)= 11.9 AC. FT.

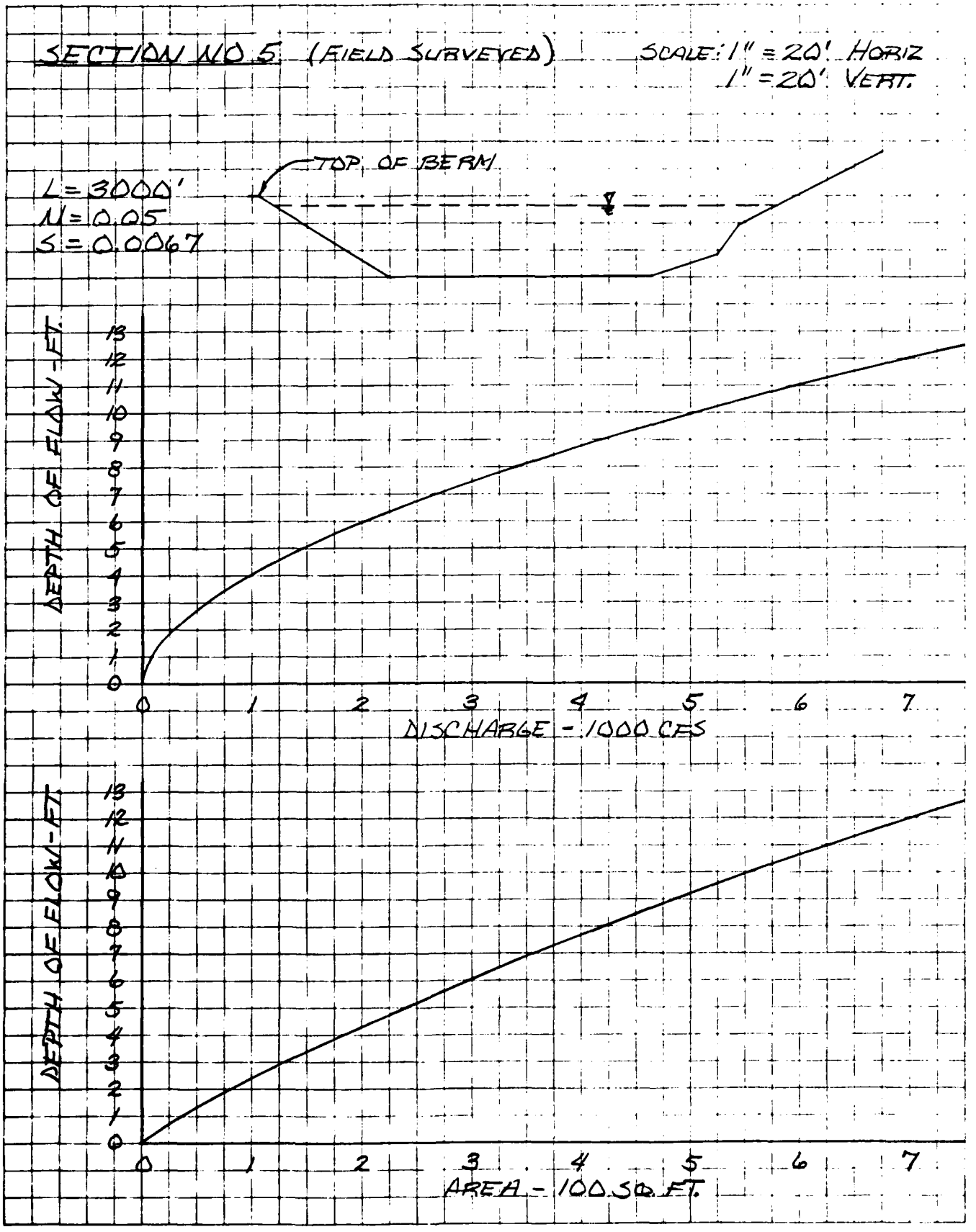
REACH OUTFLOW=QP2= 5744 CFS
DEPTH OF FLOW=H2= 10.8 FT.

BY LBG DATE 12-31-80 **ROALD HAESTAD, INC.** SHEET NO 22 OF 24

CONSULTING ENGINEERS

CKD BY SAL DATE 1-5-81 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-033

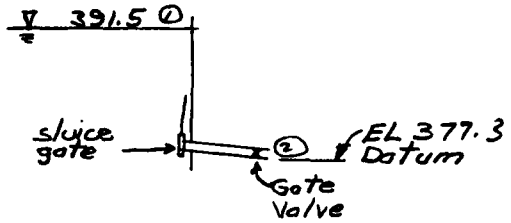
SUBJECT PIN SHOP POND DAM - FLOOD ROUTING



SUBJECT PIN SHOP POND DAM - Blowoff capacity

DATA: 1) Top of dam El 391.5
2) Pipe invert El 377.3
3) 16" Pipe - 10 feet in length

Head Losses: 1) Friction - neglected
2) Sluice Gate $= K \, V^2/2g$ $(K = 0.5)$
3) Gate Valve - 3/4 open $= K \, V^2/2g$ $(K = 0.5)$



$$P_1/\gamma + z_1 + V_1^2/2g = P_2/\gamma + z_2 + V_2^2/2g + H_{L1-2}$$

$$0 + 14.2 + 0 = 0 + 0 + V_2^2/2g + [0.5 + 0.5] \, V_2^2/2g$$

$$14.2 = [1 + 0.5 + 0.5] \, V_2^2/2g$$

$$14.2 = 2 \, V_2^2/2g$$

$$\therefore V_2 = 21.4 \text{ ft/sec}$$

$$Q_{TOP\ OF\ DAM} = V_2 A = 21.4 \text{ ft/sec} \left(\pi \frac{(16/12)^2}{4} \right)$$

$$= 29.9 \text{ use } 30 \text{ cfs.}$$

BY LBG DATE 11-6-80 **ROALD HAESTAD, INC.** SHEET NO 24 OF 24

CONSULTING ENGINEERS

CKD BY DHS DATE 12/30/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 49-033

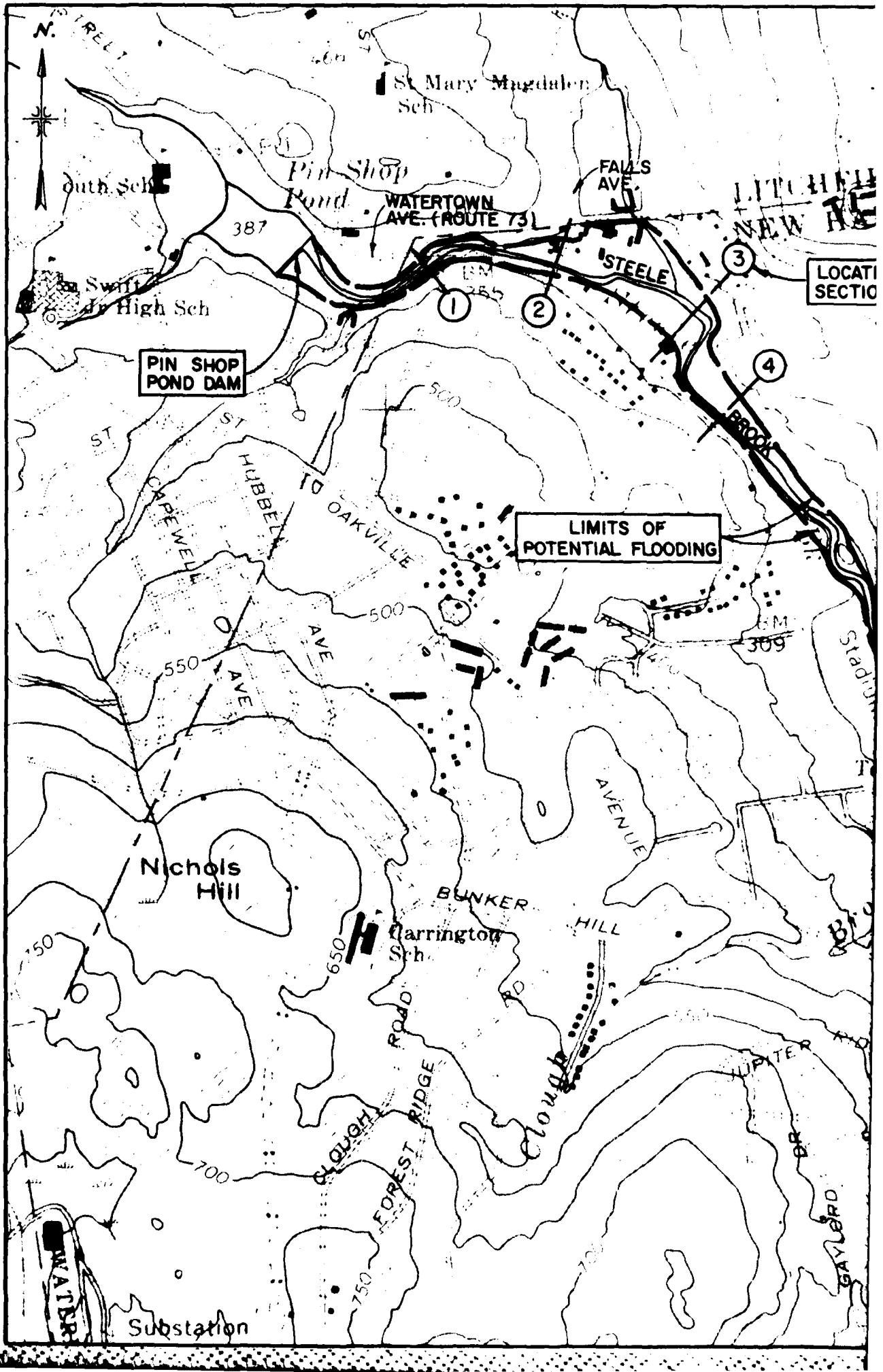
SUBJECT PIN SHOP POND - SURFACE AREAS

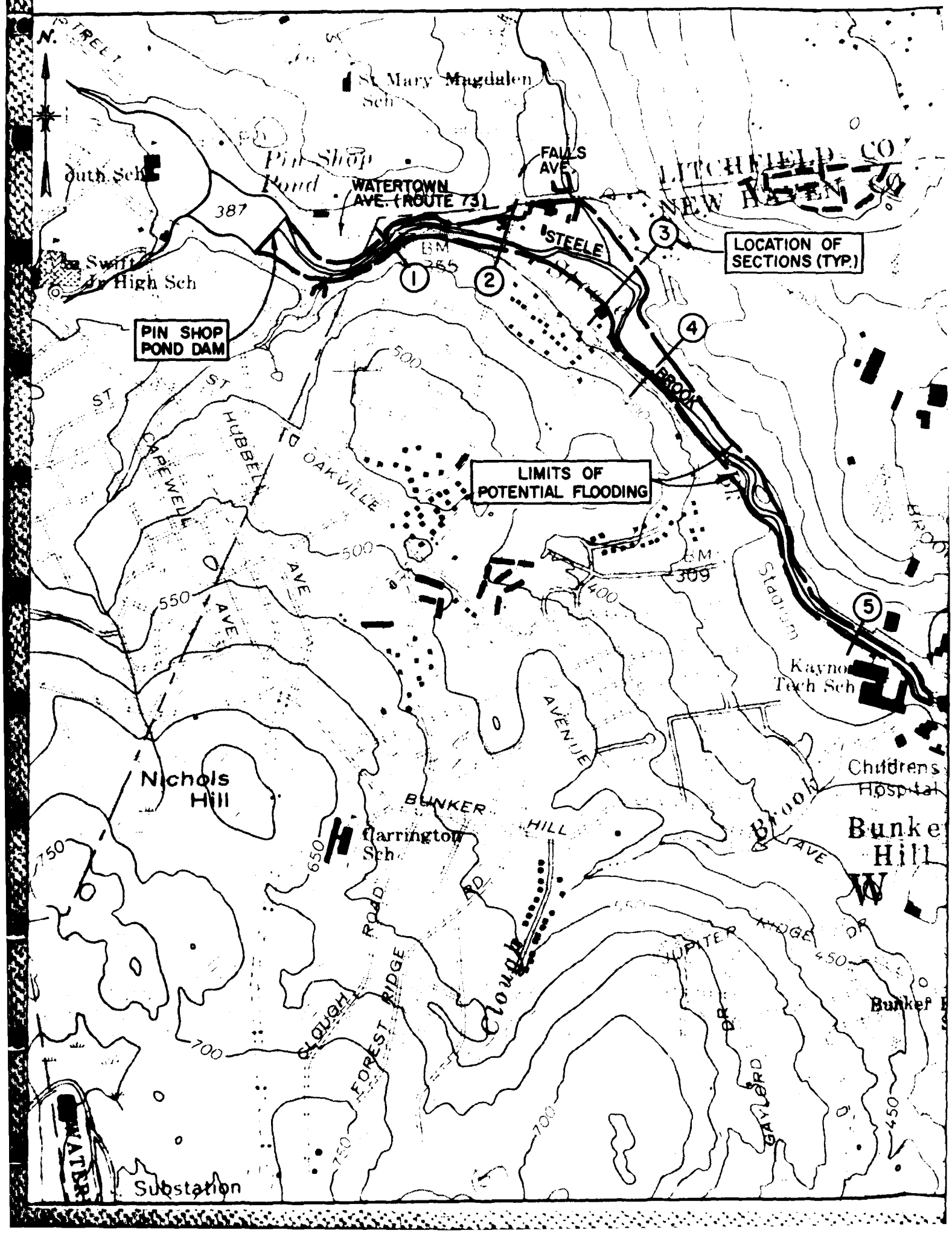
PLANIMETER NO. 60272

PLANIMETER READINGS:
(Scale: 1" = 2000')

WATER SURFACE 386.8	THIRD	05.27 SQ. IN.	.07	6.4 ACRES
	FIRST	05.12 SQ. IN	.07	
	START	05.05 SQ. IN.		
CONTOUR 390	THIRD	06.56 SQ. IN.	.13	11.9 ACRES
	FIRST	06.29 SQ. IN	.12	
	START	06.17 SQ. IN.		
CONTOUR 400	THIRD	06.91 SQ. IN.	.33	30.3 ACRES
	FIRST	06.26 SQ. IN.	.33	
	START	05.93 SQ. IN.		
WATERSHED	THIRD	65.00	20.65 × 4 = 82.6	11.9 SQ. MI.
	FIRST	23.70	20.65	
	START	3.05		

↑ A PLANIMETER CONSTANT


N.
St Mary Magdalen Sch
Pin Shop Pond
WATERTOWN AVE. (ROUTE 73)
FALLS AVE.
STEELE
PIN SHOP POND DAM
LIMITS OF POTENTIAL FLOODING
HUBBELL ST
CAPEWELL ST
TO OAKVILLE
AVE
Nichols Hill
BUNKER HILL AVENUE
Harrington Sch
CLOUGH RIDGE ROAD
Substation
387
500
550
650
700
750
309


N.
St Mary Magdalen Sch
Pin Shop Pond
WATERTOWN AVE. (ROUTE 73)
FALLS AVE
LITCHFIELD CO
NEW HAVEN CO
387
BM 365
STEELE
LOCATION OF SECTIONS (TYP.)
1
2
3
4
5
PIN SHOP POND DAM
LIMITS OF POTENTIAL FLOODING
OAKVILLE
HUBBELL
CAPEWELL
BM 309
Stadium
Kaynor Tech Sch
Nichols Hill
BUNKER HILL
Harrington Sch
Clough
FOREST RIDGE
JUPITER RIDGE DR
GAYLORD
Children's Hospital
Bunker Hill
Substation

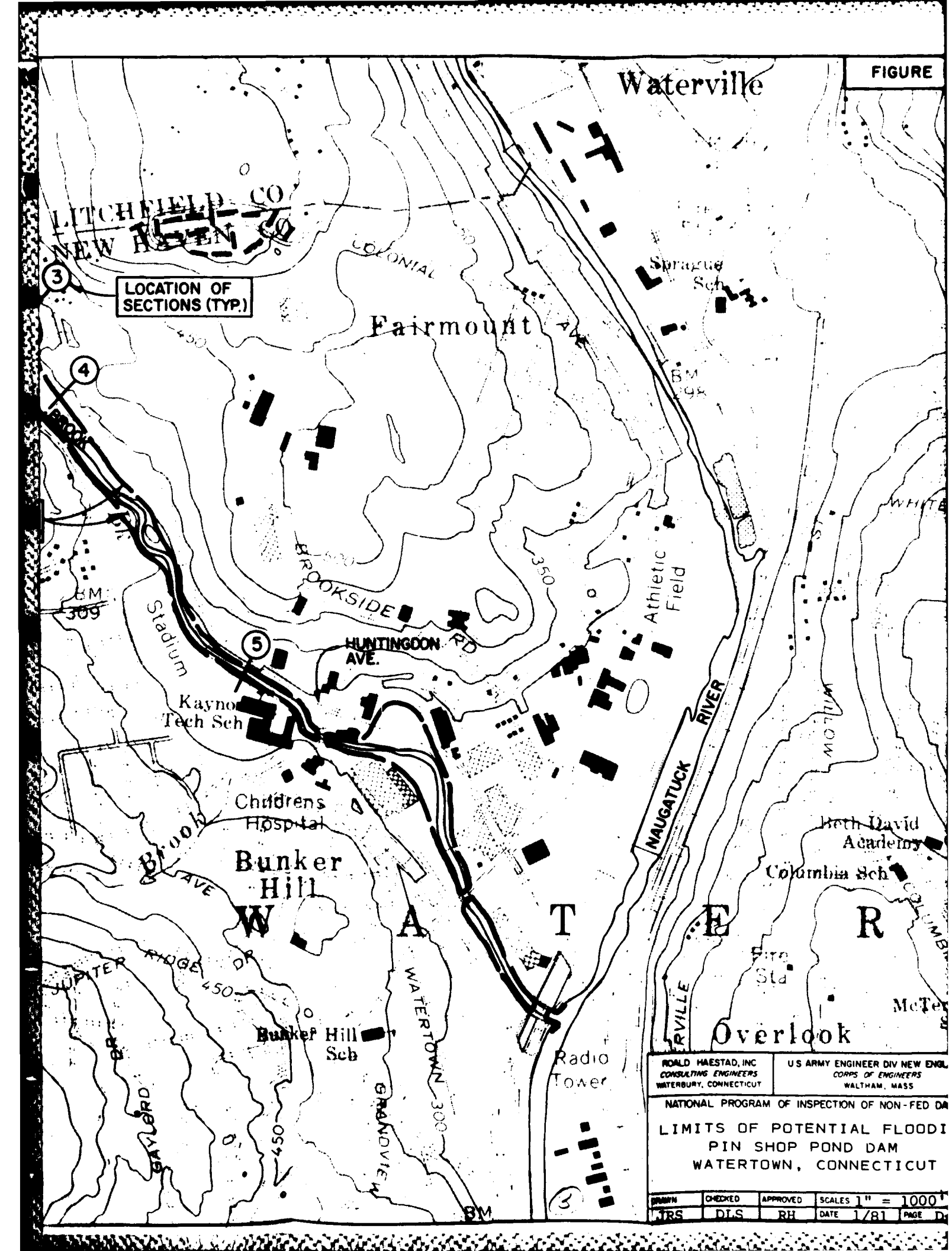


FIGURE
Waterville
LITCHFIELD CO
NEW HAVEN CO
LOCATION OF SECTIONS (TYP.)
Fairmount
Sprague Sch
COLONIAL
BROOKSIDE RD
HUNTINGDON AVE.
Athletic Field
Stadium
BM 309
Kaynor Tech Sch
Childrens Hospital
Bunker Hill
Bunker Hill Sch
JUPITER RIDGE DR
WATERTOWN
GRANDVIEW
NAUGATUCK RIVER
Beth David Academy
Columbia Sch
Fire Sta
Overlook
Radio Tower
WATER
ROALD HAESTAD, INC
CONSULTING ENGINEERS
WATERBURY, CONNECTICUT
US ARMY ENGINEER DIV NEW ENGL
CORPS OF ENGINEERS
WALTHAM, MASS
NATIONAL PROGRAM OF INSPECTION OF NON-FED DA
LIMITS OF POTENTIAL FLOODI
PIN SHOP POND DAM
WATERTOWN, CONNECTICUT
DRAWN JRS
CHECKED DLS
APPROVED RH
SCALES 1" = 1000'
DATE 1/81
PAGE D

APPENDIX E

INFORMATION AS CONTAINED IN

THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	IDENTITY NUMBER	DIVISION	STATE CODE	COUNTY CODE	CONGR DIST.	STATE CODE	COUNTY CODE	CONGR DIST.	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY	MO	YR
CT	127	NED	CT	005	04				PIN SHOP POND DAM	4135.2	7305.1	08	JAN	81

POPULAR NAME	NAME OF IMPOUNDMENT
	PIN SHOP POND

REGION	BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	DIST FROM DAM (MI.)	POPULATION
01	10	STEELE BROOK	BUNKER HILL	20	7500

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT.)	HYDRAULIC HEIGHT (FT.)	IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	IMPOUNDING CAPACITIES NORMAL (ACRE-FT.)
REPG	1870	D	23	23	42	32

DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
NED	N	N	N	N	6JAN81

REMARKS
20 ESTIMATE 22 ESTIMATE 23 FORMERLY USED FOR INDUSTRIAL WATER SUPPLY

D/S HAS	SPILLWAY CREST LENGTH	SPILLWAY TYPE	SPILLWAY WIDTH (FT.)	MAXIMUM DISCHARGE (FT.)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
1	400	U	100	3200	6000											

OWNER	ENGINEERING BY	CONSTRUCTION BY
JOHN MANCINONE + FABIANI	UNKNOWN	UNKNOWN

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	CT DEP	CT DEP

INSPECTION BY	INSPECTION DATE DAY	MO	YR	AUTHORITY FOR INSPECTION
ROALD HAESTAD INC	15	DEC	80	PL 92-367

REMARKS
34 1000CY STONE MASONRY